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Gerald L. Talbot, Jr., Assistant Deputy Administrator for Nuclear Safety and Operations, NNSA/HQ (NA-17) FORS

UPDATE OF THE DEVICE ASSEMBLY FACILITY (DAF) FIRE SUPPRESSION SYSTEM (FSS) RELIABILITY PROJECT

Reference letter from DNFSB to Thomas P. D'Agostino, dated January 18, 2008.

The purpose of this letter is to provide an update on the commitment made to the Defense Nuclear Facilities Safety Board (DNFSB) on the concerns regarding the availability and reliability of the DAF FSS as described in the referenced letter.

The National Nuclear Security Administration Nevada Site Office (NNSA/NSO) and the Managing and Operating (M&O) Contractor met with the DNFSB on April 17, 2008. The NNSA/NSO and M&O Contractor laid out a predecisional project plan describing the strategy to address the DNFSB concerns. The presentation to the DNFSB is attached for your information and use.

NNSA/NSO and the M&O Contractor committed to investigate the impact of all known FSS issues affecting system availability and reliability. The FSS Reliability Project was established to evaluate the known FSS system deficiencies which include, but are not limited to, inconsistencies in the safety basis documentation, system boundary definition, and coal tar debris in the lead-in lines caused by improper installation. The project will quantitatively evaluate the significance of the FSS deficiencies and the overall FSS reliability. Once the system reliability baseline is determined, the M&O Contractor will provide a recommendation to NNSA/NSO for correcting the identified deficiencies to improve the FSS reliability.

The scope of the project includes several tasks that must be completed to support the final recommendation to NNSA/NSO, as well as meets the commitment made to the DNFSB. The major tasks being performed under the FSS Reliability Project, their description, estimated completion dates, and status are listed below.

[illegible]	[illegible]	[illegible]	[illegible]
Remaining Coal Tar in FSS	Estimates the remaining coal tar within lines	08/04/2008	On schedule. Report was completed and within internal M&O Contractor.
Flow Testing	Validates the hydraulic calculation assumptions	08/12/2008	On schedule. Quantitative pass/fail criteria for flushing FSS lines completed on May 15, 2008. Flush data trending (coal tar quantification) completed on February 28, 2008.
Hydraulic Calculations	Evaluates the supply vs. demand of system	08/26/2008	On schedule. Calculations completed for three buildings and delivered to NNSA/NSO on July 11, 2008.
Reliability Analysis	Evaluates all known system vulnerabilities to establish system reliability baseline.	08/28/2008	On schedule. Contract issued on March 3, 2008 (Omicron). Analysis in progress.
Coal Tar Study	Analyzes the coal-tar release mechanism from the FSS lead-in lines as well as the physical, chemical, and time-phased characteristics.	10/08/2008	On schedule.
FSS Seismic Analysis	Performs seismic analysis of the DAF FSS tank and lines.	10/22/2008	On schedule.

Water Tank Inspection and Repair	Evaluates tank condition and evaluates results.	11/19/2008	On schedule. Tank inspection on schedule to support the November 2008 milestone. Tank repair moved to FY 2009. Condition of Approval on FSS boundary definition completed on May 29, 2008.
Strainer Replacement Project	Design, procurement, and installation of Nationally Recognized Testing Laboratory-compliant strainers. (Strainer replacement is independent of the November 2008 recommendation to NNSA/NSO)	03/2009	On schedule. Strainer specification, selection, and initiation of procurement completed on July 9, 2008. Installation of strainers has been moved into FY 2009.

The results of the tasks listed above will be factored into the M&O recommendation to NNSA/NSO, describing an approach for increasing the reliability of the FSS by correcting the vulnerabilities or reaffirming that the current system demonstrates compliance with the applicable requirements. The recommendation is due on November 19, 2008. After accepting the recommendation, NNSA/NSO will proceed to evaluate the most cost-effective alternatives for increasing the reliability of the DAF FSS.

The allocated funding of $2.5M includes all the tasks necessary to support the November 19, 2008, recommendation to NNSA/NSO. Recommended repairs, improvements, and strainer installation will require additional FY 2009 funding. NNSA/NSO will coordinate funding requirements with the Office of the Assistant Deputy Administrator for Nuclear Safety and Operations to balance facility and programmatic requirements while accomplishing assigned missions at DAF safely and securely.

Enclosure 2

DEVICE ASSEMBLY FACILITY (DAF)

Fire Suppression System Reliability Project (FSSRP)

PROJECT EXECUTION PLAN

PEP-PMO-1002

Revision: 1

July 31, 2008

Management System Improvement

NNSA/NSO Nuclear/WFO Mission Transformation

NTS Infrastructure Modernization

Prepared by: National Security Technologies, LLC

Under Contract: DE-AC52-06NA25946

National Security Technologies LLC
Vision • Service • Partnership

NNSA
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1.0 INTRODUCTION

1.1 Purpose

This Project Execution Plan (PEP) is the governing document for the execution of the Fire Suppression System Reliability Project (FSSRP). The PEP establishes the scope, schedule, and budget baselines for the work to be accomplished; defines the organizational elements responsible for performing the work; and provides the requirements for baseline management and reporting.

The PEP is owned and maintained by the FSSRP Project Manager. The Project Manager and the FSSRP Project Team utilize the PEP to ensure completion of the fire suppression system improvements on-budget and on-schedule.

1.2 Scope

The FSSRP is intended to evaluate issues and provide recommendations related to the reliability of the DAF Fire Suppression System (FSS) and the ability of the system to meet safety class functional requirements.

The overall mission of the FSSRP is to recommend a path to implement a fire suppression system in the DAF that has demonstrated and has been verified to meet or exceed the code and performance requirements specified in UCRL-10-154613 Rev. 2, *Documented Safety Analysis*, and DAF-TSR-01 Rev. 6, *Technical Specification Requirements in Section 3/4, Fire Suppression System*, which are in the process of being implemented.

The scope of the FSSRP has been divided into two phases. Phase 1 includes activities that will lead to FSSRP recommendations. Phase 1 establishes current operational conditions and identifies upgrades required to meet the specified system requirements. Phase 1 also includes upgrades deemed necessary to address critical issues that impact the near term FSS reliability. Phase 2 represents the work required to implement and test the upgrades identified in Phase 1. Phase 2 may become a separate project depending upon the required upgrades and NSO guidance.

This PEP is limited to the scope of work included in Phase 1. The scope, schedule, and budget for Phase 2 will depend on the Phase 1 results. After the required upgrades have been identified, the scope, schedule, and costs for implementation and testing will be incorporated into the baselines and into a revised PEP using a formal baseline change proposal and process (see Section 3.2, Project Baseline and 3.3, Baseline Change Control of this PEP) prior to execution of Phase 2.

The Phase 1 scope of work for the FSSRP is divided into the following elements:

A. Project Management

Provide a project management and support team to oversee the project work and monitor progress using the systems and processes identified in the CM-V000.001, *NSTec Project Management Manual*, Rev. 2, June 09, 2008. The PM team will utilize a configuration management and EVMS control techniques to manage and control the project baselines (scope, cost, and schedule).

B. DAF FSS Engineering Studies and Tests

Provide a technical basis for the DAF DSA/TSR and FSS system reliability. Provide input for determining subsequent decisions on FSS repairs/modifications/upgrades.

- Evaluate the FSS lead-ins and make a determination to repair, replace, or no action needed. Lead-ins are dependent upon Non-destructive Examination (NDE) tests.
- Conduct a study to determine the coal tar release mechanism from the FSS lead-in piping. Analyse coal tar for physical, chemical and time phased characteristics. Provide information for mod/repair/replace the lead-in pipes.
- Conduct flow tests of FSS. Provide basis for the reliability model for determining whether the facility FSS passes or fails surveillance requirements. Change existing surveillance flushing procedure to incorporate quantitative pass/fail criteria. Other flow tests will be conducted to validate assumptions made in the hydraulic calculations.
- Inspect FSS water tank and repair as necessary and to determine whether a new tank is required to support current and future planned missions.

C. DAF FSS Walk down and Hydraulic Calculations

Perform hydraulic calculation utilizing NFPA 13 recognized model Hydraulic Analyzer of Sprinkler Systems (HASS).

D. DAF FSS Strainer Addition and Modifications

Perform engineering design, purchase and installation of Nationally Recognized Testing Laboratories (NRTL) approved strainers with sufficient capacity to capture debris that would impair the sprinkler heads. Achieve compliance and ensure required flow density is achieved. Update/revise hydraulic flow calculations.

E. DAF FSS Seismic Analysis

Conduct a seismic analysis of the FSS to determine the seismic status of all FSS components.

F. DAF FSS Reliability Model

Provide a technical basis for the DAF Documented Safety Analysis/ Technical Safety Requirements (DSA/TSR) and FSS system reliability. Provide input for determining subsequent decisions on FSS repair/modification/upgrades.

G. Other FSS Open Issues

Identifying and prioritizing all FSS-related open issues, including VSS/SMP issues related to the DAF FSS not otherwise captured by the FSSRP scope elements identified above.

Refer to Section 3.6 for an expanded discussion of the Execution Strategy within each WBS SOW outlined above.

1.3 Objectives

The primary objectives for Phase 1 and Phase 2 are described in order below:

Phase 1:

A. Determine "as-is" system capability and reliability and whether the FSS meets specified code and performance requirements.

B. Identify deficiencies and engineering upgrades to enable the system to meet the specified requirements.

C. Re-estimate the schedule and budget for the project to incorporate the implementation and testing of the upgrades identified.

D. Finalize list of upgrades to be implemented, and update the PEP to include the revised scope, schedule, and budget.

E. Explore new/alternative FSS upgrades to replace or enhance current system(s)

F. Document proposed path forward to NSO in a FSSRP Recommendation Report.

Phase 2 (Potential New Project – Revised or New PEP Required):

A. Obtain approval and funding for selected upgrades.

B. Update maintenance and test procedures, and installed upgrade design basis documentation.

C. Implement and test the upgrades known to be required in order to address critical near-term issues.

D. Update design basis documentation (DAF System Design Description – SDD, Fire Protection) to reflect selected upgrades based on current code of record.

E. Implement required upgrades.

F. Modify surveillance and acceptance tests in DAF Surveillance Procedures and In- Service Inspections (ISIs) as appropriate.

G. Perform validation testing to demonstrate satisfactory compliance with the specified requirements.

1.4 Project Drivers

1.4.1 Programmatic Drivers

Continued operation of the DAF, within its approved authorization basis to perform its intended function, requires critical systems such as the FSS to be functional through the limits specified by the DSA. System condition and performance issues have been identified that may impact the FSS reliability to perform per existing specified requirements. The primary driver for the project is the need to establish the technical baseline and reliability for the "as-is" condition of the FSS system to support continued operations in the DAF and future mission objectives.

The primary issues are as follows:

- Coal tar was used to line the riser lead-in piping, which was subsequently welded instead of using mechanical connections. The welding caused significant degradation of the coal tar properties in the pipes adjacent to the welds, diminishing corrosion protection, pipe liner adherence properties, and resistance to entrainment. Coal tar flaking can plug lines and must be evaluated.
- The original safety basis excluded the primary FSS supply tank from the safety class boundary of the facility. This eliminated safety class seismic requirements from the design and installation of the tank and tank feed lines to the DAF FSS.
- Internal and external field oversight activities have identified deficiencies that will be evaluated as part of the FSSRP.

1.4.2 Requirements

The primary requirements are driven by the UCRL-10-154613 Rev. 2, *Documented Safety Analysis* (DSA) document (pending review) for the facility, which establishes the safety class system boundaries and performance requirements for the FSS. Additional requirements are identified in DAF-TSR-01 Rev. 6, *Technical Safety Requirements* (TSR) document. Both documents are in the process of being implemented.

1.5 Assumptions

The following planning assumptions have been made to support the schedule and budget estimates:

- Adequate funding will be available to execute the work in accordance with the baseline project schedule.
- The required upgrade work may be performed during continued operation of the facility by integrating any intrusive work into the integrated Facility Master Schedule to avoid conflicts with operations.
- Entry to perform work in areas within the DAF will be allowed within a week's notice.
- Security support and escort services will be provided to support contractor access to the facility.
- Qualified vendors are found in a timely manner to execute the work in accordance with the FSSRP baseline schedule.
- This PEP does not take into account the effects of adverse funding allocations due to continuing resolution for FY09. It assumes funding above the Device Assembly Facility (DAF) FY09 baseline will be in place to complete the entire scope of work (SOW).

1.6 End State Definition – Specific Elements

The end state of Phase 1 is defined by the following conditions:

- The Hydraulic Analysis report has been issued and includes the calculated flow rate and pressure analysis of the total FSS system per the requirements of NFPA-13 for the "as-is" condition.
- Engineering design of NRTL approved strainers is complete and procurement of and strainer installation has been initiated.
- The Reliability Analysis Report has been issued that provides a technical basis for the DAF/TSR and FSS system assumed reliability factor. The analysis will determine the reliability factor for the FSS. Included are the overall estimated reliability of the "as-is" FSS to perform per the specified requirements, and a list of the incremental gains in reliability that would be realized for each of the proposed modifications to the system.
- The Coal Tar study report has been issued and includes the release mechanism from the FSS lead-in piping. Also included are the analysis results showing the physical, chemical, and time phased characteristics of the coal tar in the existing system. List the recommendations and justification for modifications, repairs, or replacement of the lead-in piping to mitigate the identified issues.
- The FSS Lead-in piping condition report has been issued providing the "as-is" condition of the piping.

- The FSS water tank evaluation is complete and a determination has been made whether to replace or repair the tank in order to meet specified requirements.
- The seismic analysis report on the FSS has been issued providing the seismic status of all FSS components.
- A recommendations report has been issued summarizing the results of all analysis on the FSS performed, listing the recommended upgrades and justification, the estimated fractional impact on reliability each modification will have, and the cost and schedule estimates to complete the upgrades through validation testing (Phase 2).
- New NRLT-approved strainers have been procured.
- The project baselines and the PEP have been formally updated to reflect the Phase 2 scope, schedule, and budgets or a new PEP representing a new project has been developed.

1.7 Project Schedule

Phase 1 of the FSSRP is scheduled for completion by November 20, 2008 culminating in the delivery of a FSSRP Recommendations Report. Key project milestones are illustrated in Figure 1.

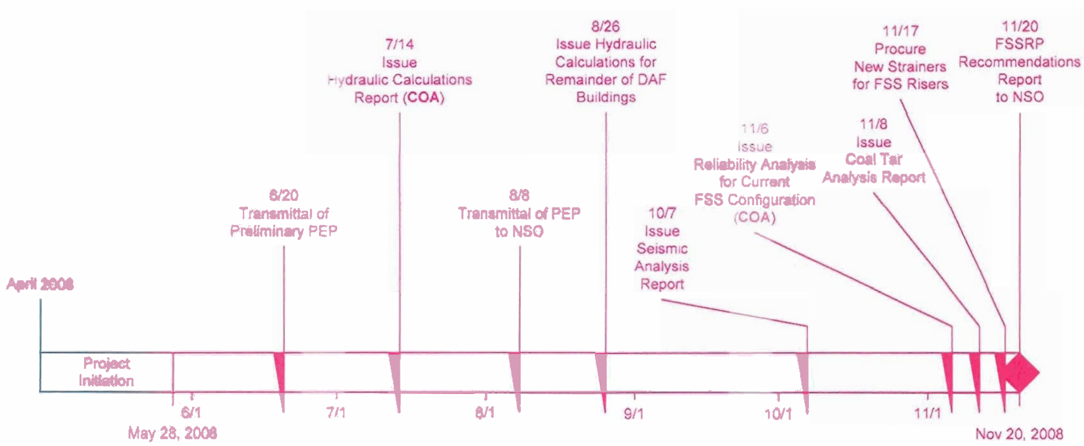


Figure 1. Fire Suppression System Reliability Project Timeline

Specific key milestones for the project that are the focus of this PEP include the following:

- Completion of a reliability analysis report for the current FSS configuration (**COA**)
- Completion of a seismic analysis report for the current FSS configuration
- Completion of a hydraulic analysis report for the current FSS configuration (**COA**)
- Evaluation of the 250,000 gallon water tank
- Completion of a coal tar analysis report
- Procure new strainers for installation in FSS risers
- Issuance of a FSSRP recommendations report

Other activities that will be conducted during the execution of the FSSRP are detailed in the resource-loaded schedule described in Section 2.5, Schedule.

Activities that will be conducted after the issuance of the FSSRP recommendations report that are not included in the scope of this PEP will include further refinement of the FSS reliability analysis, potential installation of new water tank, revisions to the SDD, DSAs, TSRs, and operational procedures.

2.0 PLANNING APPROACH

2.1 Project and Work Authorization

NSO Authorization

Formal funding authorization from NNSA/NSO was provided with approval of the *DOE/NNSA/NSO Task Plan WBS No. 101180102 NEO and the DOE/NNSA/NSO Task Plan WBS No. 101050104 DAF*. Changes exceeding thresholds described in Section 3.2 will require NSO approval.

NSTec Authorization

The NSTec Nuclear Operations Division Manager has authorized the Project Manager to perform the FSSRP (see attached Task Plan in Appendix B.)

Funding Initial Source(s) – NEO and RTBF

Current funding for the project includes $2 million from NEO and $500K from Readiness in Technical Base and Facilities (RTBF).

Project Authorization Task Plan

The Project Manager (PM) will authorize the CAMs, indicated in the Responsibility Assignment Matrix (RAM), by completing and distributing form FRM-2080. *Control Account Plan*.

Other Authorization Activities

The FSSRP Project Manager will be responsible for determining the applicability of the following analyses and classification activities for the FSSRP as appropriate:

- Environment, Safety, and Health (ES&H) Hazard Analysis
- Securities Activities Analysis
- National Environmental Policy Act (NEPA) Checklist
- Real Estate/Operations Permit (REOP) Risk Management Checklist
- Site/Facilities Hazard Analysis/Classification

2.2 Organization

2.2.1 Project Organization Structure

To ensure the successful execution of the FSSRP, a dedicated team of highly skilled managers and technical staff has been assembled. The project organization is illustrated in Figure 2.

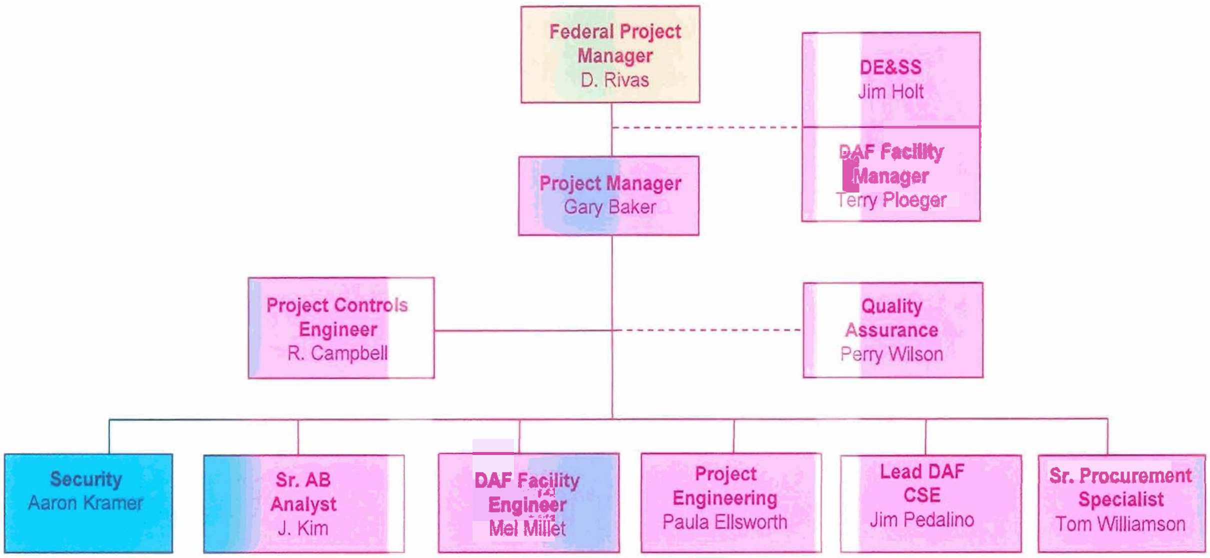


Figure 2. Fire Suppression System Reliability Project Organization

The NSTec Project Manager has been assigned the responsibility to manage the successful execution of the FSSRP. The Project Manager is responsible for the successful execution of the project scope within established schedule and budget constraints. The Project Manager sets project priorities and is responsible for reviewing and communicating project status to all project stakeholders.

The project manager will be supported by seven (7) project technical leads. Each project technical lead reports to the PM and is responsible for the successful execution of their defined technical discipline area. They are responsible for task assignments within their designated discipline areas and ensuring all applicable project requirements are met.

2.2.2 Roles and Responsibilities

Table 1 lists the key project team members, their roles in the project, and each of their responsibilities.

Table 1. Project Team Members Roles and Responsibilities

Project Team Member	Role	Responsibilities
D. Rivas	Federal Project Manager	• Establishes and manages requirements and performance metrics • Defines project scope • Assures goals and objectives are met • Ensures that work is done safely and securely within appropriate schedule and budget change control processes • Ensures federal authorization and approvals are completed appropriately
Gary G. Baker	Project Manager	• Customer satisfaction • Single point of accountability to NSO and NEO Project Manager • Total management of project

Project Team Member	Role	Responsibilities
		• Primary point of contact for all project activity • Responsible for compliance with project scope, schedule, budget, and quality control • Ensure compliance with all safety requirements
Roy Campbell	Project Controls Engineer	• Prepares, maintains and updates project baseline schedule • Performs milestone tracking • Monitors working schedule performance against baseline schedule • Provides schedule input to monthly reports • Performs progress monitoring and prepares monthly cost update reports • Presents earned value management status • Tracks accruals versus actuals • Monitors project cost performance
Mel Millett	DAF Engineering and Operations Coordination	• Responsible for integration of project activities with DAF Master Schedule • Approves designs for engineered modifications at DAF – Serves as Design Authority at DAF
Paula Ellsworth	Engineering Support Across All Project Areas	• Responsible for execution and technical adequacy of all FSS related engineering and design activities
Tom Williamson	Procurement	• Responsible for all project related procurement activities • Responsible for managing procurement activities to support project baseline schedule milestones
Perry Wilson	Quality Assurance	• Develops and implements the Quality Assurance Plans and Procedures • Performs project QA Assessments • Monitor and enforce quality process compliance • Provide feedback to the Project Team concerning quality issues • Responsible for contractor pre-qualification and developing an approved vendor list
Gary Baker	Coal Tar Studies, and Reliability Analysis	• Responsible for execution of and technical adequacy of coal tar studies and reliability analysis
John Kim	Authorization Basis	• Project activities for compliance with safety class and safety significant SSC requirements • Schedules and conducts authorization basis compliance review
Jim Pedalino	FSS CSE Support	• With DAF safety class, safety significant system, structures, and components (SSCs)
Aaron Kramer	Security Support	• Provides safeguards and security interface between the project and DAF

2.2.3 Project Contact Information

Table 2 provides contact information for all key personnel responsible for the execution of the FSSRP.

Table 2. Project Team Contact Roles and Responsibilities

Project Team Member	Title/Position	Contact Information
D. Rivas	Federal Project Leader	RIVASJL@NV.DOE.GOV
Gary G. Baker	Project Manager	BakerGG@nv.doe.gov
Roy Campbell	Project Controls Engineer	CampbeRL@nv.doe.gov
Mel Millett	DAF Facility Engineer	MilletMR@nv.doe.gov
Paula Ellsworth	Project Engineering	ELLSWOPM@nv.doe.gov
Tom Williamson	Sr. Procurement Specialist	WILLIATA@nv.doe.gov
Perry Wilson	Quality Assurance	WilsonPJ@nv.doe.gov
Gary Baker	Coal Tar Studies, and Reliability Analysis	BakerGG@nv.doe.gov
John Kim	Sr. Authorization Basis Analyst	KIMJ@nv.doe.gov
Jim Pedalino	Lead DAF CSE	PEDALIJP@nv.doe.gov
Aaron Kramer	Security	kramer@nv.doe.gov

2.3 Work Breakdown Structure (WBS)

The Level 7 WBS for the FSSRP is presented in Table 3. A detailed description of the activities performed under each WBS element is provided in Appendix C.

Table 3. Level 7 FSSRP Work Breakdown

FSSRP Work Breakdown Structure	
WBS Level 7	**WBS Level 7 Element**
1.01.18.01.02.05.01	DAF FSS Project Management
1.01.18.01.02.05.02	DAF FSS Engineering Studies & Tests
1.01.18.01.02.05.03	DAF FSS Walk down and Hydraulic Calculations
1.01.18.01.02.05.04	DAF FSS Strainer Addition and Modifications
1.01.18.01.02.05.05	DAF FSS Seismic Analysis
1.01.18.01.02.05.06	DAF FSS Reliability Model
1.01.18.01.02.05.07	Other FSS Open Issues

2.4 Cost Estimates

Table 4 provides the cost estimate for each WBS element for the FSSRP.

Table 4. FSSRP Cost Estimate

FSSRP Cost Estimate			
		Cost Estimate ($000)	
WBS Element	WBS Title	FY08	FY09
1.01.18.01.02.05.01	DAF FSS Project Management	224	658
1.01.18.01.02.05.02	DAF FSS Engineering Studies & Tests	600	18
1.01.18.01.02.05.03	DAF FSS Walk-down and Hydraulic Calculations	650	-
1.01.18.01.02.05.04	DAF FSS Strainer Addition and Modifications	38	1,570
1.01.18.01.02.05.05	DAF FSS Seismic Analysis	142	-
1.01.18.01.02.05.06	DAF FSS Reliability Model	348	-
1.01.18.01.02.05.07	Other FSS Open Issues	-	184
	Total	**$ 2,001**	**$ 2,431**

2.5 Schedule

Table 5 provides the key FSSRP milestones. The detailed resource-loaded project schedule is provided in Appendix D, Project Schedule.

Table 5. FSSRP Key Milestones

Key FSSRP Milestones		
WBS Element	**Milestone Description**	**Scheduled Completion**
1.01.18.01.02.05.01 DAF FSS Project Management	Continued project support activities throughout the FSSRP to include, but not limited to, administrative support, safeguard and security, cost and scheduling, etc.	September 30, 2009
1.01.18.01.02.05.02 DAF FSS Engineering Studies & Tests	Approve and Issue Coal Tar Study Complete Flow Test Determine repairs for FSS components	November 8, 2008 August 26, 2008 November 20, 2008
1.01.18.01.02.05.03 DAF FSS Walk down and Hydraulic Calculations	Complete Walkdowns of DAF Buildings Complete hydraulic calculations COA (COA extended to August 26, 2008) Provide hydraulic calculations for rest of DAF	September 6, 2008 July 11, 2008 August 26, 2008
1.01.18.01.02.05.04 DAF FSS Strainer Addition and Modifications	Procure NRTL approved strainers and upgrade flow calculations	September 15, 2008
1.01.18.01.02.05.05 DAF FSS Seismic Analysis	Complete seismic analysis of FSS	October 7, 2008
1.01.18.01.02.05.06 DAF FSS Reliability Model	Complete reliability model	November 6, 2008
1.01.18.01.02.05.07 Other Open FSS Issues	Address the VSS/SMP issues and other open issues related to FSS	September 30, 2009

2.6 Risk Management

A Risk Management Plan has been developed that describes how risk management will be structured and performed on the FSSRP. The goal of the RMP is to ensure that significant risks that could affect the ultimate success of the project are identified and appropriately managed throughout the project lifecycle. This risk management plan development process is designed to direct attention and resources to risk scenarios which could significantly impact cost and schedule of the FSSRP. Because of the nature of this project, only qualitative risk factors have been used to identify, assess, and prioritize project risks.

The result of the risk management process was the development of a risk register that the project team uses to manage risk throughout the life of the project. The risk register identifies or provides:

- Project risks that can affect the success of the project
- A brief description of risk factors
- Risk mitigation strategies
- Monitoring requirements
- Assignment of ownership for the risk item

The PM, with support from the project team and assigned risk owners, is responsible for managing risk during the execution of the FSSRP. Risk management is an ongoing process used throughout the life cycle of the project. Elements within the risk register will be monitored and the risk register will be updated, as needed. The approach used to develop the risk register is provided in Appendix E, Risk Management. The risk register is also provided in Appendix E.

2.7 Quality Assurance

For the Device Assembly Facility, NSTec as the Design Authority, maintains the Master Equipment List (MEL) in which the safety classifications of the structures, systems, and components are identified. The Structures, Systems, and Components (SSCs) are classified as Safety Class (Quality Grade 1), Safety Significant (Quality Grade 2), and Important to Safety (ITS), or Balance of Plant (Quality Grade 3). The NSTec Manager of Engineering and his organization acts as the Design Agency for DAF.

The grading rigor to be applied to the quality requirements at the project management level resulted in a Quality Grade 1. The resultant Quality Assurance Plan (QAP) when considering NSTec support activities for Quality Grade 1 SSCs is with the DAF Quality Officer. NSTec Contractor Assurance developed the risk evaluation, grading, and the resultant quality plan. The Project Manager in his role of managing cost, scope, and schedule, maintains cognizance of the quality grades and plans in the PEP for the support organizations at the DAF as described below.

Contractor Assurance has participated in developing a quality grading of NSTec DAF activities for SSCs identified as Safety Class or Safety Significant. An overall Quality Grade 1 has been ascribed for those activities. The applicable Quality Assurance Program for Quality Grade 1 SSCs will be followed by NSTec Design Engineering, Procurement, Maintenance and Construction consistent with their own SEP Quality Grading and QAP requirements.

Similarly, those organizations will perform activities associated with DAF ITS SSCs consistent with their SEPs identified in Section 2.1.2 and the Quality Grade 3 requirements identified in the PD-0001.0002, *NSTec Quality Assurance Plan (QAP)*.

The activities associated with DAF Balance of Plant SSCs will be consistent with their SEPs and the Quality Grade 3 requirements of the QAP. In addition, the quality related activities for other DAF SSCs not specifically classified in the MEL will be consistent with the Quality Grade 3 requirements of the QAP. Project and task specific quality requirements are specified based on the required rigor determined jointly by the DAF Manager and the NSTec support activity. The project team will follow the QA requirements outlined in the Fire Suppression System QAP (draft). NSTec document. QARD 3200.001, *Quality Assurance Requirements Document*, provides the quality grade requirements for the aspects outlined in Table 6 below for the FSSRP.

Table 6. Quality Grade Requirements

Criteria	Grade			
	1	2	3	4
1. Program	X			
2. Personnel Training and Qualification	X			
3. Quality Improvement	X			
4. Documents and Records	X			
5. Work Processes and Activities	X			
6. Design	X			
7. Procurement	X			
8. Inspection and Acceptance Testing	X			
9. Management Assessment	X			
10. Independent Assessment	X			

2.7.1 Quality Plan

The quality process is based on the following components:

- Proven methodologies and standards
- Effective monitoring procedures
- Effective change. problem and issues management
- Review and acceptance procedures

2.7.2 Methodology and Standards

The FSSRP Project will utilize where appropriate and in affect at the time of the plan issuance:

- Quality Management (e.g., the QAP Quality Management System, ISO 9000 standards)
- Output Development Methodology (e.g., APT Development Methodology release (most current version) for software development)
- Project Management Methodology consistent with the Project Management Institute or equivalent industry standards (e.g., user, technical, design, training)

2.7.3 Project Evaluation

The measurement of the success of a project provides valuable input in to the continuous improvement for the following phases of a project, or for subsequent projects. This evaluation forms an important part of the Project's Quality Plan.

Improvements may be identified in the areas of the planning process, the development process, the utilization process, or to the project management processes in general.

2.8 Records

2.8.1 Record Keeping

The following records may be generated by the project team and retained for the Project Manager by the team lead for Records Management. They shall be retained in accordance with the Project Management Record Procedures as outlined herein and will be retained in accordance with these procedures.

At a minimum, the following project-specific records will be generated as a result of this project:

- Project Execution Plan
- Hydraulic Calculations
- Strainer Replacement (procurement, installation)
- Reliability Calculation
- Coal Tar Analysis
- Water Tank Inspection and Repair
- Flow Test
- Lead-in Pipe Analysis Extent of Condition
- Water Tank and Pipe Seismic Analysis

The following is a list of possible records that may be generated:

- Project Management Records
- Project Proposals
- Incident Reports
- Problem Reports
- Change Requests
- Change Request Register
- Open Issue Reports
- Open Issue Register
- Quality Assurance Records
- Documents related to Decision Points
- Training/Qualification Records

2.8.2 Records Required by the PM, Project Team, and Stakeholders

Request for access to the above records, will be through a records request form. Only copies of records will be issued with the originals retained by the Project Records Management Program.

2.8.3 Retention of Records

Records shall be retained according to the Archives Act. Additional retention or access requirements may be identified by NSTec or the Project Manager.

2.9 Acquisition Strategy

2.9.1 Acquisition Approach

The following work performed during Phase I of the FSSRP will be subcontracted:

- Reliability analysis – Omicron Safety and Risk Technologies
- Hydraulic analysis – Hughes and Associates (subcontracted through Omicron)
- Inspecting and repairing 250,000 gallon water tank - TBD
- Non-destructive testing to support coal tar analysis - TBD
- Coal tar study - TBD

Potential performance subcontractors will be identified by Procurement with the assistance of Engineering. Advertising on the Federal Business Opportunities website for sources sought for the specific type of work will be required. The source solicitations will require subcontractors with previous experience working to NQA-1 and on QC-1 at DOE and/or NRC Nuclear related projects. This will assure that selected companies have approved QA programs that can meet NSTec QA requirements.

The procurements will be expedited by utilizing procurement packages for similar previous procurements to assist in developing the new procurement packages.

The SOW and Specifications for the major procurements will be reviewed ahead of time to assure compliance with NSTec Procurement procedures. Upon receipt of an approved requisition, the Procurement Representative will proceed with preparing the procurement package in accordance with the approved Procurement Department Organizational Procedures.

NSTec will solicit suppliers who can perform both the inspection/testing and the required repairs. If the supplier is not able to perform both tasks, NSTec will follow the same up front procedures of advertising for sources and reviewing the SOW or specifications in order to allow a smooth procurement process. Options will be included in the original purchase orders to allow NSTec to exercise the option in an expedited manner to a selected qualified supplier.

2.9.2 Procurement Process

Purchasing Specification

Design Engineering will be responsible for the development of the specifications and SOW for all of the purchased goods and subcontracts required for this project. Design Engineering is responsible for transmitting these requirements to the Procurement Department in a timely manner and in accordance with NSTec CD-3400.001, *Requisitioning Process*.

Selection of Suppliers

It is the Procurement Departments responsibility to purchase all necessary products, services, and construction in accordance with the procedures set forth in the Approved Procurement Department Organizational Procedures and as defined in the NSTec Prime Contract.

Subcontract Management

Subcontract Management is the responsibility of the Procurement Department in accordance with the approved Procurement Department Organizational Procedures, with the assistance of Subcontract Technical Representative (STR) in accordance with the STR Handbook and working in conjunction with the Procurement Departments Subcontract Administrator.

Inspection and Testing of Purchased Goods & Services

Inspection and testing, purchasing goods and services will be conducted, as appropriate, by the Engineering Department and/or the FSSRP QA Lead.

Records Required

The Procurement Department Organizational Procedures contain standard requirements for the retention of records.

2.10 Lessons Learned on Similar Projects

The Project team will follow the guidance provided in CD-3200.013, *Operating Experience/Lessons Learned Program*, which include processes and requirements for identifying, developing, screening, evaluating, distributing (internally and to external sites), and using operating experiences and lessons learned to improve mission performance and operational awareness in the conduct of work (environment, safety, quality, health performance, and operational efficiencies).

In a memo to file, the Project Manager identifies applicable significant lessons learned from previous projects, and state lessons learned implementation approaches for this project. This memo must be updated upon completion of major project milestones, in association with the related effort to generate lessons learned identified in PM Manual, "Project Lessons Learned." This identification/implementation document is a brief summary of significant lessons learned as opposed to a long list of any applicable lesson learned from the past.

2.11 Safety

Prior to work being performed, all required safety training will be performed and all proper Personal Protective Equipment (PPE) will be identified through the Job Hazard Analysis and Pre-Task Hazard Review process according to CM-0444.001-004, *Job Hazard Analysis and Pre-Task Hazard Review*. All DAF work to be performed will be coordinated, deconflicted, and approved by the DAF Facility Manager.

3.0 EXECUTION APPROACH

3.1 Project Management Approach

This project will be managed consistent with application of the principles and tools prescribed by the NSTec project management process described in NSTec CM-V000.001, *Project Management Manual*, Rev. 2, June 09, 2008.

3.2 Project Baseline

Scope, schedule, and budget baselines for the FSSRP are established by this PEP. The Project Manager is responsible for tracking progress against the baselines, identifying and understanding variances and their root causes, and facilitating implementation of timely corrective actions as needed to ensure the project baseline scope is completed within the baseline budget and schedule.

Tracking to the baselines will be performed using earned value management techniques in accordance with NSTec CM-V000.001, *Project Management Manual*, November 30, 2007. Earned Value (EV or BCWP) and Actual Costs (AC or ACWP) will be tabulated monthly to assess current period and cumulative cost and schedule performance relative to the baselines.

A monthly report will be issued (See Section 3.4 Reporting) that provides the overall status of the project relative to the baselines, includes formal variance analyses for any Schedule Variance (SV) or Cost Variance (CV) that exceed 10%, provides a recovery plan for returning the performance back to the baseline, and forecasts how long the recovery will take.

Any changes to the baselines must be authorized by an approved Baseline Change Proposal (BCP). Baseline management will be accomplished by identifying, analyzing, and managing the cost and schedule variances.

3.3 Baseline Change Control

Management, control, and integration of scope, schedule, and cost of the FSSRP baseline is consistent with NSTec procedures and meets the requirements for configuration management and change control. The integrity of the baseline is maintained through formal change control as scope, cost, and schedule baseline changes are identified, cost savings opportunities are identified, or funding assumptions change. Formal techniques and actions, as outlined in NSTec project management processes and procedures, are implemented for baseline management and control.

The FSSRP baseline is based on a definitive scope of work and has an established schedule and budget. For any proposed project baseline change, the PM and project team are responsible for developing the Baseline Change Request (BCR) and completing all impact analyses associated with the change.

A project-level Change Control Board (CCB) has been established for the FSSRP. The CCB is chaired by the PM and includes representatives from each of the major areas associated with the DAF and the FSSRP that may be impacted by a change to the baseline plans.

The project-level CCB has authority to approve changes to the project baseline if a:

- Proposed change is anticipated to cause a cumulative increase in project baseline cost of less than $250.000.
- Proposed change is not anticipated to cause a delay in the overall scheduled project completion milestone of November 20, 2008 (Phase 1).

If the change threshold is above the project level CCB authority, approval will be provided in accordance with PLN-1019.001, *Configuration System Management Plan*. This plan establishes the thresholds for review/approval by NNSA/NSO. The table below summarizes approval levels:

Table 7. Baseline Change Approval Levels

Approval/Authority Level	Cost Change	Scope Change	Schedule Change
Level 1 – NNSA/HQ		Changes in approved scope that affect mission need and requirements	Changes in schedule milestones involving NSO external commitments
Level 2 – NNSA/NSO	Over $250K	Change to scope that may impact operation functions and potentially affect mission need and requirements	Changes in schedule milestones greater than 30 calendar days or may impact the project completion milestone
Level 3 – M&O	Less than $250K	Change to scope that might impact operation functions, but does not affect mission need and requirements	Changes which do not impact the schedule beyond 30 calendar days and do not impact the project completion milestone

This PEP also falls under Change Control Requirements. Approved baseline changes will be reflected in a revised PEP as part of the formal baseline change control process. The PEP will be re-issued with the change noted and new version number cited. [6 month frequency].

3.4 Reporting

Monthly reports will be issued to NSTec senior management and NNSA/NSO, including evaluation of key performance metrics (i.e., scope, cost, and schedule) and any issues requiring additional management support by the project manager.

A formal set of project reporting requirements has been established. The reporting requirements and associated frequencies applicable to this project are listed below:

- Weekly schedule progress updates from the project team is provided to the PM.
- Weekly cost reports are reviewed by the PM.
- Monthly Reports to NSTec senior management including evaluation of key performance metrics (i.e., scope, cost, and schedule) and any issues requiring additional management support.

Routine project meetings will be conducted with key project stakeholders to discuss current status, schedules, issues, and upcoming activities. Key measurable elements in the performance monitoring process are:

Management of project scope – Ability to complete all scheduled tasks, including the completion of all project documentation.

- Management of the project schedule – Reflected in the schedule baseline verses actual schedule performance (Schedule Performance Index).
- Management of project cost – Reflected in the project budget baseline versus actual project cost (Cost Performance Index).

3.5 Responsibility Assignment Matrix

The RAM described in Table 8 identifies the NSTec organizational responsibilities and project team member responsibilities for each Level 7 WBS element.

Table 8. FSSRP RAM

FSSRP Resource Assignment Matrix					
WBS Level 7	**WBS Level 7 Description**	**A499 - Nuclear Services**	**AC20 - DAF**	**G7P0 – Project Engineering**	**Project Team Lead**
1.01.18.01.02.05.01	DAF FSS Project Management		1		G. Baker
1.01.18.01.02.05.02	DAF FSS Engineering Studies and Tests			1	P. Ellsworth
1.01.18.01.02.05.03	DAF FSS Walk down and Hydraulic Calculations			1	P. Ellsworth
1.01.18.01.02.05.04	DAF FSS Strainer Addition and Modifications			1	P. Ellsworth
1.01.18.01.02.05.05	DAF FSS Seismic Analysis	1			J. Pedalino
1.01.18.01.02.05.06	DAF FSS Reliability Model		1		G. Baker
1.01.18.01.02.05.07	Other FSS Open Issues	1			C. Watters, et.al.*
	Grand Total	**2**	**2**	**3**	

* See WBS Dictionary provided in Appendix C.

3.6 Execution Strategy for the Scope of Each WBS Element

The process that will be used to accomplish each of the major deliverables is described below by WBS Element. See the WBS Dictionary in Appendix C for additional details of the work scope to be completed within each WBS element.

A. 1.01.18.01.02.05.01 DAF FSS Project Management

This project will be managed consistent with application of the principles and tools prescribed by the NSTec project management process described in PMM.

B. 1.01.18.01.02.05.02 DAF FSS Engineering Studies & Tests

In general, studies will be initiated by preparing a Statement of Work procuring subject matter expert and specialty subcontractor services as required, performing the study, reviewing and approving the results, and issuing the report. Testing will be performed using existing DAF FSS approved test procedures. Any new tests required to verify piping and pressure vessel integrity (e.g. operational testing or hydro-testing) will require approved test procedure(s) be developed in accordance with the applicable codes and requirements. A report that documents the extent of the coal tar condition will be developed and provided as input to the reliability analysis. The report will include recommended corrective measures. To include, but not limited to, the following studies and tests:

- NDE on FSS lead ins
- Flow tests of FSS
- Coal tar sloughing analysis mechanism
- Time phased chemical and physical analysis of collected coal tar samples
- Evaluate availability of back up fire suppression related systems for the DAF

C. 1.01.18.01.02.05.03 DAF FSS Facilities Walk-down and Hydraulic Calculations

Activities related to FSS facilities Walk-down and Hydraulic Calculations include, but are not limited to, the following:

- Walk-down facility risers and sprinklers. Piping configuration data will be input to the model based on red-lined as-built drawings developed from walk-downs in each area as part of this project.
- Conduct hydraulic calculations to meet COA. The initial hydraulic calculations will be based on the updated as-built piping configurations after the revised piping drawings have been reviewed and approved. Once the hydraulic model is complete, it will be used to calculate flow rates and perform pressure analyses per NFPA-13 requirements.
- Perform calculations for the remainder of the DAF buildings
- Implement flow tests and modify surveillance procedures
- Report the results of the analyses to establish "as-is" projected performance data. The calculation and report are needed as inputs to the reliability analysis.

D. 1.01.18.01.02.05.04 DAF FSS Strainer Addition and Modifications

A walk-down of all risers will be performed to initiate the design process for the new strainers. The strainer design will be developed, reviewed, and NRTL approved using

NSTec standard engineering processes. A procurement package will be developed, the strainers will be procured, and receipt inspection against the design will be performed. A construction work package containing appropriate isolation requirements and alternative fire suppression system support for each affected area will be drafted, formally approved, and executed for the installation of the strainers. The completed modifications will be inspected, the as-built drawings will be revised, and the flow model will be modified to reflect the new piping configuration in preparation for a post strainer installation hydraulic analysis. Flow tests will be performed in accordance with standard DAF FSS procedures. A final hydraulic calculation, utilizing DAF FSS, will be performed for post strainer installation and used as input to the reliability analysis. The following activities will be performed in the sequence indicated:

- Develop basis for strainer requirements
- Procure FSS strainers
- Develop DAF FSS modification design requirements
- Develop DAF FSS strainer engineering change package
- Validate engineering drawings for strainers
- Develop construction work control documents
- Modify and install DAF FSS strainers
- Issue as-built FSS drawings
- Perform final hydraulic calculation

E. 1.01.18.01.02.05.05 DAF FSS Seismic Analysis

A seismic analysis will be performed on the FSS. An engineering report will be prepared, and an independent review will be completed prior to issuing the final report.

F. 1.01.18.01.02.05.06 DAF FSS Reliability Model

The reliability model will be performed by OMICRON based on the as-is condition of the FSS to include data collected under the engineering studies activities outlined above. The reliability model will include:

- NDE of FSS lead-ins
- Flow tests of FSS
- Coal tar studies
- Hydraulic calculations
- Seismic analysis

G. 1.01.18.01.02.05.07 Other FSS Open Issues

(VSS/SMP) Deficiency Tracking System (DTS) Issues and other FSS open issues.

All open issues/findings will be closed with FY09. Examples include, but are not limited to, the following:

- FSS tank gauge and monitoring.
- There was no objective evidence that the DAF TSR requirement for flow density was derived from the FSS design.

- Design criteria were not consistently maintained between design and safety documents.
- DAF's fire protection program assessments need to increase their scope/depth.
- DAF-SDD-FPS inconsistent with the DSA.

4.0 READINESS ACTIVITIES

All work proceeding under this project will, as a minimum, be reviewed by the DAF AB organization for USQ screens. Additional reviews, such as independent verifications and validation/calculations, data, imports, etc., will be conducted by the subject matter expert identified as the responsible CAM on Appendix C.

If an operational building does not meet requirements as stated in the DSA and TSR at the end of Phase 1, compensatory measures will be put in place and a Justification for Operations (JCO) will be submitted to NSO for approval. Determination will be made by reviewing the documentation prepared during Phase 1. Temporary measures will be invoked until engineered upgrades can be accomplished.

The following activities will be performed to ensure readiness:

- Design and Safety Specification Review
- Review Operational Procedures
- Assess Equipment and Components
- Perform Work Control
- Select Personnel
- Perform Inspection, Testing, and Calibration
- Perform Quarterly FSS Maintenance Procedure and TSR Surveillances

5.0 PROJECT CLOSEOUT

Completion of all project deliverables and acceptance by the customer, confirms that Phase I of the DAF Fire Suppression System Reliability Project has met its objectives without disrupting or interrupting DAF facility operations. The project manager is responsible for all activities associated with project closeout. The following activities will be completed during project closeout:

- Development of a Project Closure Report that is approved by the project sponsor and customer. The closure report outlines the activities that project manager must undertake to bring the project to closure. The project is closed only when all activities in the Project Closure Report have been completed.
- Conduct of Final Project Performance Review to determine the overall success of the project and capture open issues for further resolution that will be addressed in Phase 2 of the project. The Project Manager is responsible for developing a project performance review team consisting of key managers (e.g., DAF Facility Manager) and subject matter experts as needed. The review team will document their findings in a final report.

- Development of Lessons Learned will occur throughout the planning and execution of the FSSRP and will be documented in a final Lessons Learned Report as part of the project closeout.
- Administrative and financial closeout occurs as the last step of the project.
- Completion of all project activities per the NSO approved PEP.
- Submittal of the final Phase 1 FSSRP report with recommendations to NSO and other appropriate stakeholders.

APPENDIX A. DNFSB LETTER

The following letter was a correspondence between Thomas P. D'Agostino, Administrator at NNSA/DOE and A.J. Eggenberger, Chairman of the DAF Safety Board.

A.J. Eggenberger, Chairman
John E. Mansfield, Vice Chairman
Joseph F. Bader
Larry W. Brown
Peter S. Winokur

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700 Washington, D.C. 20004-2901
(202) 694-7000

January 18, 2008

The Honorable Thomas P. D'Agostino
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Mr. D'Agostino:

The Device Assembly Facility (DAF) at the Nevada Test Site continues to implement planned activities that expand its mission, including receipt, storage, and operations involving special nuclear material; nuclear explosive operations; and the installation of equipment to perform potential criticality experiments. The Defense Nuclear Facilities Safety Board (Board) has identified major issues with the safety related fire suppression system. These issues call into question the ability of the system to perform reliably in case of need. The Board has previously expressed concerns respect to the reliability of the DAF fire suppression system in letters to the National Nuclear Security Administration (NNSA) dated November 3, 2004, and November 28, 2005. The fire suppression system deficiencies raised in those letters remain largely unaddressed.

Board's staff recently conducted a review of fire protection at DAF and identified several significant issues concerning the availability and reliability of safety-class and safety-significant fire protection features. The fire suppression system does not meet the typical design features for a safety-class system, e.g., redundancy to preclude a single active failure or a safety-significant system. In addition, the potential for impairment of the existing fire suppression system is not clearly defined in the DAF safety basis. These issues are documented in the enclosed report.

In the past year, the Nevada Site Office conducted vital safety system reviews, safety management program assessments, and a review of the draft update to the DAF safety basis. These efforts have also identified a list of deficiencies in the fire protection system at DAF.

The Board is especially concerned about the continuing degradation of the underground piping that supplies water to the DAF fire protection system. This degradation results in ts of debris in the water supply, which can adversely impact the fire protection system. The Board does not believe that periodic flushing and cleaning of strainers is ensuring that the fire protection system will perform as anticipated in the

DAF Documented Safety Analysis. The Board believes this long-standing problem with the water supply piping needs to be resolved before more hazardous nuclear operations, e.g., nuclear explosive operations or criticality experiments, begin at DAF. Corrective actions and appropriate compensatory measures need to be developed and implemented promptly to address this and other issues discussed in the enclosed report, as well as deficiencies identified by Nevada Site Office.

Therefore, pursuant to 42 U.S.C. § 2286b(d), the Board requests that NNSA provide a briefing to the Board within 45 days of receipt of this letter to address the following questions:

1) What actions will be taken to correct deficiencies in DAF's fire protection water supply?

2) What is the schedule to improve the reliability of DAF's fire suppression systems?

Sincerely,

A. J. Eggenberger

A. J. Eggenberger
Chairman

c: Mr. Gerald L. Talbot, Jr.
Mr. Mark B. Whitaker, Jr.

Enclosure

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
Staff Issue Report

November 20, 2007

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: C. March
J. Deplitch

SUBJECT: Fire Protection at the Device Assembly Facility

This report documents a review conducted by the staff of the Defense Nuclear Facilities Safety Board (Board) of fire protection at the Device Assembly Facility (DAF) at the Nevada Test Site. To perform this review, staff members C. March and J. Deplitch met with representatives of the Laboratory Joint Nevada Test Site Program Office, Lawrence Livermore National Laboratory, National Security Technologies, LLC, and the National Nuclear Security Administration's Nevada Site Office (NSO).

Background. DAF was designed in the 1980s, with construction of the facility beginning in April 1988. Lawrence Livermore National Laboratory and Los Alamos National Laboratory took beneficial occupancy in 1996, and operations began in 1998.

DAF has a fire protection program as required by Department of Energy Order 420.1A, *Facility Safety*. Passive protection features incorporate 2-hour rated fire barriers between the various DAF buildings, creating separate fire areas, while active fire suppression consists of automatic sprinklers. The water supply for DAF is provided by a 250,000 gallon on-ground steel water storage tank located on a hill approximately 0.5 miles behind and 230 feet above DAF. A single 12-inch diameter main feeds a 10-inch diameter cement-lined ductile iron underground distribution loop, providing domestic potable, industrial, and firefighting water to DAF.

All buildings (except the parking garage, Building 510) are currently protected by automatic sprinkler systems. The systems in buildings that would support nuclear explosive operations are designated safety-class, while the systems in buildings for the downdraft table, glovebox, and Criticality Experiments Facility are designated safety-significant. DAF also has a fire alarm system to warn personnel of fires, radiation alarms, security intrusions, or gas attacks in the facility. Should any of these threats occur, the fire alarm system would respond with audible and visual warnings unique to the threat. Both levels of DAF are also provided with portable fire extinguishers and equipped with wet standpipe systems for use by the Nevada Test Site fire department.

Underground Piping. The ability of the fire protection water supply system to provide sufficient water to safety-class and safety-significant automatic sprinkler systems is a concern. During initial installation of the water distribution system at DAF (in about 1987), the 27 fire suppression system lead-in pipes were installed using coal-tar-lined steel pipe. These pipes should have been joined using mechanical fittings, but the installing contractor field-welded the joints. The welding damaged the coal-tar coating, which has subsequently been flaking off. This was first observed in about 1994, approximately 4 years after DAF was turned over to NSO. With the pipe's protective coating absent, corrosion of the interior steel pipe walls at every welded joint began and continues to this day. The loose pieces of coal tar lining material could impair the fire suppression system. Several hundred joints and several thousand feet of underground fire mains are affected.

To address these conditions until repair or replacement of the lead-ins could be accomplished, the Nevada Test Site operating contractor initially began flushing the underground mains and installed strainers in the fire protection risers. The contractor later flushed the piping within DAF to remove any material that might have lodged in the pipe before the problem was discovered. The contractor also performed internal video surveillance of representative underground piping to obtain a visual confirmation of the extent of the damage in 1995 and 2000. NSO has not secured funding to repair or replace the damaged piping since the problem was first discovered. Trending of the results of the flushing was first suggested in 1998, but did not begin until this year

As of September 15, 2007, DAF had flushed 17 of the 27 suppression system underground mains as part of a biannual flushing requirement. Of those mains completed, the DAF system engineer considers 4 to have failed the surveillance because of excessive debris, and they are being flushed on an accelerated schedule in an attempt to remove all loose material. Building 712 underground piping has been flushed more than 10 times, with over 6 kg of debris being collected. Other poorly performing systems piping included Building 491 (1.7 kg collected), Building 492 (0.5 kg), and Building 494 (1.2 kg).

During a system walkdown, the Board's staff noted that the strainers installed in the risers are not listed or approved for fire protection service. An evaluation is needed to validate that the installed equipment meets or is equal to the requirements of National Fire Protection Association (NFPA) 13, *Standard for the Installation of Sprinkler Systems*, and NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*. Equipment that is not acceptable should be replaced. The Board's staff also observed that the mesh size of the strainers varies according to the size of the strainer, and was not selected on the basis of its effectiveness in straining the system's debris or meeting the NFPA 25 recommendation for 3.2 mm (1/8-inch) perforations.

Underground Lead-in Flushing Procedure. After reviewing the procedure used to flush the underground lead-ins and witnessing the activity, the Board's staff identified several issues related to the adequacy of the procedure:

APPENDIX B. TASK PLAN

DEPARTMENT OF ENERGY
NATIONAL NUCLEAR SECURITY ADMINISTRATION
NEVADA SITE OFFICE (NNSA/NSO)
TASK PLAN

PAGE 1 OF 1

FY 08 NNSA/NSO TASK PLAN

1 DATE **9-Apr-2008**
2 REVISION **Rev. 0**
3 CONTRACT NO. DE-AC52-06NA25946
4 CONTRACTOR NAME National Security Technologies

5 WBS NUMBER 101180102
6 WBS TITLE NEO

7 B&R CODE (HQ Control Level) or INDIRECT POOL	OPERATING	GPP	LINE ITEM	CAPITAL EQUIPMENT
	DP11			

8 NNSA/NSO PROGRAM/PROJECT(S) or FUNCTIONAL MANAGER(S)
9 PLANNED START DATE 1-Mar-2008
10 PLANNED FINISH DATE 30-Sep-2008
11 NATIONAL LAB SIGNATURE (if applicable) (Print Name) (Signature)
12 DESIGNATED CONTRACTOR MANAGER James L. Holt (Print Name) (Signature)
13 NNSA/NSO ASSISTANT MANAGERS/REPRESENTATIVES Bob Golden (Print Name) (Signature)
14 SCOPE OF WORK DESCRIPTION

This Task Plan outlines activities required to stand-up nuclear explosive operations at the Device Assembly Facility (DAF)

FY 08 Carry in $0 FY New BA $8.54M

15a	MILESTONE/DELIVERABLE TITLE	DATE	15b	MILESTONE/DELIVERABLE TITLE	DATE
1 -	Weekly updates to NSO	weekly	11 -		
2 -	Participation in weekly classified VTCs	weekly	12 -		
3 -	Tritium monitors procurement	Q4, FY08	13 -		
4 -	Flame retardent cabinets and fire extinguishers installation	Q4, FY08	14 -		
5 -	Gravel gertie installation	Q3, FY08	15 -		
6 -	Seal penetrations completion	Q4, FY08	16 -		
7 -	JAMBI shipment to Las Vegas museum	Q3, FY08	17 -		
8 -	GARD/VETNA packaging at Las Vegas museum	Q3, FY08	18 -		
9 -	Ship 1-trainer to Las Vegas museum	Q4, FY08	19 -		
10 -	Submit 2 closure packages for Master Study findings	Q4, FY08	20 -		

RESOURCE DISTRIBUTION

16 APPLICABLE COST CATEGORY

CURRENT FISCAL YEAR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	TOTAL FY
BCWS $K (e.g., Labor, Material, ODC, etc.)						96	1,044	783	642	1,569	908	2,895	7,937
TOTAL DIRECTIVE HOURS						585	2,599	4,030	3,301	3,832	4,641	4,298	23,286

See Attached Baseline Element of Cost Report for Detailed Spread of Cost and Hours

APPENDIX C. FSSRP WBS DICTIONARY

Row Count	WBS	WBS Level	WBS Title	CAM (Responsible Person)	Responsibility Count	Responsible Organization	Scope Description	Deliverables / Milestones	*Earned Value Measurement Technique	End State Condition	Assumptions
1	101180102	5	NEO								
2	1.01.18.01.02.05	6	DAF Fire Suppression System Reliability Project (FSS)	Baker	1	AC20 - Device Assembly Facility	See Project PEP (in progress - due 6/18)		% complete		
3	1.01.18.01.02.05.01	7	DAF FSS Project Management	Baker	1	AC20 - Device Assembly Facility	Schedule: Resource Loaded		% complete	Succesfull management and completion of project.	
4	1.01.18.01.02.05.01.01	8	DAF FSS Project Management	Baker	1	AC20 - Device Assembly Facility	Schedule: Resource Loaded		% complete		
5	1.01.18.01.02.05.02	7	DAF FSS Engineering Studies & Tests	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Procurement requirements and procure vendor qualified per 10CFR830.120, NQA1 or other equivalent quality program; to perform non destructive test(s), which may include bore scope, ultrasonic and/or other process, to determine extent of any excessive, beyond normal corrosion in buried 4–6" coal tar epoxy lined, wrapped pipe. Data must provide wall thickness at random points. Lines in question, approximately 100 ft long, are 8–10ft below grade and are accessible from one end. Excavation is an option; to determine the coal liner separation mechanism from the pipe substrate (i.e. physical, chemical, biological, etc.) and determine the extent and mechanism of ongoing corrosion; to provide quantitative analysis of liner and water; to perform a time-phased physical and chemical analysis of coal tar that has been recovered from the system from approximately 1988 to 2008. The time-phased analysis periodicity should be proposed but should not be greater or less than every two years from the sample population unless technical justification is provided; to recommend technically sound and financially practical solutions to the coal tar separation and corrosio to document findings and proposed solution(s) in report format, including raw data and basis for selection who has prior experience successfully executing a project similar to this project at either an NRC licensed	Engineering will write a procurement spec for the deliverable as an engineering specification.	% complete	Report and provide test result documentation of as-is status of system, extent of conditions (example: coal tar sloughing), establish documented basis upon which decisions and recommendatons moving forward are based.	Tests for sub vendor and lead-ins. Find a vendor - develop a SOW. Develop spec's for procurement . Procurement requires QSL qualifications.
6	1.01.18.01.02.05.02.01	8	Repair, Replace or Use As Is DAF FSS Lead-ins	Calovini	1	A499 - Nuclear Services	Evaluate the FSS lead-ins and make a determination to repair, replace, or no action needed. Lead-ins are dependent upon NDE Tests	A report on the condition of lead ins with recommendation	% complete		We will need a subcontractor to provide the information for the decision. Coal tar study must be completed prior to decision. Construction available for the excavation. Subcontractor needs access to do excavation. Select a representative for lead in
7	1.01.18.01.02.05.02.02	8	Remaining Coal Tar in FSS Report	Calovini	1	A499 - Nuclear Services	Calculation of volume of coal tar remaining in individual lead ins / pipe	A report on my estimation of the coal tar remaining in the lin.	% complete		Rough order magnitude estimate based on available data
8	1.01.18.01.02.05.02.03	8	Conduct Flow Tests of FSS	Calovini	1	A499 - Nuclear Services	Two flow tests: 1) Annual Flow Test Check for coal tar run per the procedure. 2) DNFSB Flow Test per Brian Fiscus: Determine flow test through installed strainer to ensure they're adequate for the volume of coal tar discharged during operation. (deferred until strainers are procured and installed).	1) flushing report for 2008 2) A report on the testing of the installed sprinklers in 2009	% complete		1). Normal maintenance flushing by end of July 2). Develop procedure meeting Brian Fiscus NNSA/NSO expectations
9	1.01.18.01.02.05.02.04	8	Perform NDE on FSS Lead-ins	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Required in RFP for Subcontractor to provide testing. See level 7 for more detailed scope	Test report	% complete		1) This will be subcontracted with engineering and CSE oversight. 2) Qualified supplier
10	1.01.18.01.02.05.02.05	8	DAF FSS Tank Inspection, Repair & Path forward	Rast	1	A499 - Nuclear Services	1) Development of the specification for inspections and repairs and procurement of services to perform activity. 2) Development of an FSS compensatory measures for water supply during inspections / repairs. 3) Determine safety requirements for subcontractor 4) Analysis results of tank inspection and determine make or buy for tank repair	1) Inspection report of suggested repair 2) Procedure to reroute water system with calculation 3) Letter report from NSTec Safety 4) Contractor report on the tank condition and engineering analysis of the report	% complete		1) Using inspection report 2002 as a basis of our SOW for refurbishing the DAF water tank also for preliminary estimate. 2) Take current hydraulic calculations and validate the back up water supply meets that criteria. 3) Take other compensatory measures as needed 4) Ed Erwin will review all safety documents for subcontractor to make sure it's in 451.Compliance 5) Review previous contractors for work performed at NRC and/or DOE nuclear facilities. 6) Contract Modifications may be required should conditions warrant changes.
11	1.01.18.01.02.05.02.06	8	Develop Tank Inspection Criteria Engineering Support	Pedalino	1	A499 - Nuclear Services	Required in RFP for Subcontractor to provide inspection. Criteria part of the procurement specification to be developed with CSEs and Engineering	An inspection criteria document	% complete		The criteria used to formulate the inspection is predicated on the history of the similar work on other work at NTS
12	1.01.18.01.02.05.02.07	8	Perform Tank Inspection	Pedalino	1	A499 - Nuclear Services	Inspect/Assess the tank per the criteria specified in the subcontract.	Inspection Report suggested repairs	% complete		1) Qualified Vendor to perform inspection and repairs 2) NSTec NDE will oversee the subcontractor in the NDE work and validate the results and recommendations and approve the recommendations.
13	1.01.18.01.02.05.02.08	8	Perform Tank Repairs	Pedalino	1	A499 - Nuclear Services	Based on the recommendation from the assessment/inspection we will authorize the subcontractor to repair the tank	Perform Repairs	% complete		1) The tank needs repairs 2) The tank is repairable
14	1.01.18.01.02.05.02.09	8	Modify or Replace DAF Tank	Baker	1	AC20 - Device Assembly Facility			% complete		
15	1.01.18.01.02.05.03	7	DAF FSS Walk down and Hydraulic Calculations	Ellsworth	1	G7P0 - PROJECT ENGINEERING	See Breakdown below for 01 and 02		% complete	Satisfy requirements of COA, provide input for design of strainers and FSS upgrades, provide input to reliability analysis	
16	1.01.18.01.02.05.03.01	8	Walk Down Facility Risers & Sprinklers	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Perform initial walk down of each riser in DAF Information shall be drafted in CAD format for use in calculations • Drawing format shall be as established by DAF (Downdraft Table and Glovebox shall use format as established by each project) • Revisions to existing drawings shall maintain the information from the existing drawings. • New building specific drawings shall isolate the information from a common drawing When drafted a confirmation walk down will be performed A Configuration Management drawing shall be issued with the hydraulic calculation	29 Walkdowns 29 sets of drawings 29 Final Walkdowns 29 sets CM drawings	% complete		1) Assumes 605 and 500 are in scope. 2) Use the CEF walk-down can be used. 3) Building availability
17	1.01.18.01.02.05.03.02	8	Perform Hydraulic Calculations for FSS (CoA)	Ellsworth Hughes (3) NSTec (26)	1	G7P0 - PROJECT ENGINEERING	Hydraulic calculations shall be performed based on the information from the walk down drawings. Three calculations required for CoA, with an option of 10 more calculations, shall be performed by Hughes Associates, Inc. The remainder of the calculations shall be performed by NSTec. All calculations shall be performed to the NSTec Engineering Division Design Manual qualified program and approved by the appropriate NSTec personnel.	29 calculations	% complete		1) Use of CEF Calculations 2) 26 to be done by NSTec 3) Calculations to be validated for 50% blockage in strainer 4) Calculations to be done per NFPA 13 5) Calcs to be done by DOE 1066 6) Surface roughness ________XXX 7) 152 gallons per minute domestic water use CEF construction adheres to design

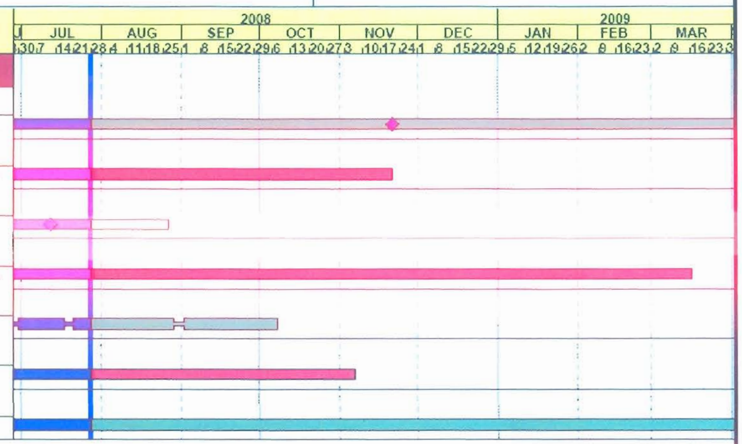
Row Count	WBS	WBS Level	WBS Title	CAM (Responsible Person)	Responsibility Count	Responsible Organization	Scope Description	Deliverables / Milestones	*Earned Value Measurement Technique	End State Condition	Assumptions
18	1.01.18.01.02.05.04	7	DAF FSS Strainer Addition and Modifications	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Determine requirements/ select strainer, write procurement specification, procure appropriate strainer		% complete	Establish documentation necessary to support commercial dedication of strainers	
19	1.01.18.01.02.05.04.01	8	Develop Basis for Strainer Requirements Engineering Support	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Determine requirements/ select strainer, write procurement specification, procure appropriate strainer	Procurement specification	% complete		All criteria is firmly established
20	1.01.18.01.02.05.04.02	8	Develop DAF FSS Mods Design Requirements	Millett/Solis	1	AC20 - Device Assembly Facility	Develop DAF FSS Mods Design Requirements	DAF change package	% complete		
21	1.01.18.01.02.05.04.03	8	Develop New DAF FSS Strainer Mods Drawings	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Write 27 ECNs to newly executed configuration management drawings	27 ECNs (approx. 2 drawings per ECN)	% complete		Shall be provided as (Engineering Change Notices in) an Engineering Change Package to the verified walk down revised drawings
22	1.01.18.01.02.05.04.04	8	Validate Engineering Drawings for Strainers	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Incorporate ECP into configuration management drawings upon completion of installation	Incorporation of 27 ECNs	% complete		Installation is complete
23	1.01.18.01.02.05.04.05	8	Develop Construction Work Control Documents	Millett	1	AC20 - Device Assembly Facility	Develop Construction Work Control Documents	Work control documents	% complete		
24	1.01.18.01.02.05.04.06	8	Procure FSS Strainers Engineering Support	Ellsworth/Williar	1	G7P0 - PROJECT ENGINEERING	Engineering to provide procurement specification and support for RFP.	Issue one contract	% complete		Criteria is firmly established
25	1.01.18.01.02.05.04.07	8	Modify / Install DAF FSS Strainers Engineering Support	Cox	1	G411 - Z4 Maint Supervision	Develop Work Packages and install strainers.	Write work package / complete installation of 27 strainers	% complete		
26	1.01.18.01.02.05.05	7	DAF FSS Seismic Analysis	Pedalino	1	A499 - Nuclear Services	Evaluate if the results of the tank inspection above and make an evaluation / recommendation whether or not seismic analysis is feasible	Evaluation Report	% complete	Provide defensable and documented seismic analysis for system and system compents	
27	1.01.18.01.02.05.05.01	8	Perform Seismic Analysis on DAF Tank & Lead-ins	Pedalino	1	A499 - Nuclear Services	Evaluate if the results of the non-destructive testing above and make an evaluation / recommendation whether or not seismic analysis is feasible	Evaluation Report	% complete		
28	1.01.18.01.02.05.05.02	8	Develop Engineering Work Plan for FSS Work	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Develop Engineering Work Plan for FSS Work	Engineering Work Plan	% complete		Scope of work is firmly established
29	1.01.18.01.02.05.05.03	8	Evaluate Available Backup FSS for the DAF	Rast/Ellsworth	1	A499 - Nuclear Services	Engineering and DAF CSE to investigate backup systems and provide alternative solutions	Back-Up FSS Report	% complete		
30	1.01.18.01.02.05.06	7	DAF FSS Reliability Model	Baker	1	AC20 - Device Assembly Facility	Performed by Omicron		% complete	Respond to COA, defend reliability factor basis, provide documented basis for recommenations to NSO	
31	1.01.18.01.02.05.06.01	8	Perform Reliability Analysis of FSS (CoA)	Baker	1	AC20 - Device Assembly Facility	Performed by Omicron		% complete		
32	1.01.18.01.02.05.06.02	8	Time Phased Coal Tar Analysis Report	Baker	1	AC20 - Device Assembly Facility	Sub contractor		% complete		
33	1.01.18.01.02.05.06.03	8	Perform Analysis on Coal Tar Sloughing	Baker	1	AC20 - Device Assembly Facility	Sub contractor		% complete		
34	1.01.18.01.02.05.07	7	VSS/SMP DTS Issues		1	A499 - Nuclear Services				Address issues identified in DTS, provide documented closure of DTS issues	
35	1.01.18.01.02.05.07.01	8	Revise DSA /TSR	Kim	1	AC20 - Device Assembly Facility	Revise DSA /TSR to clarify FSS delivery requirements and define FSS safety boundary.	Revised DSA /TSR	50 50		VSS Issues DTS-06-283, -284, -286, -287, -288 Dependent on hydraulic calcs
36	1.01.18.01.02.05.07.02	8	Revise DAF-SDD-FPS	Rast	1	A499 - Nuclear Services	Revise DAF-SDD-FPS, to clarify FSS delivery requirements and define FSS safety boundary	Revised DAF-SDD-FPS	50 50		VSS Issues DTS-06-283, -284, -286, -287, -288 Dependent on hydraulic calcs
37	1.01.18.01.02.05.07.03	8	FAS testing documentation	Rast	1	A499 - Nuclear Services	Determine if FAS testing documentation meets NFPA 72	Determination of testing documentation	50 50		VSS Issue DTS-07-250
38	1.01.18.01.02.05.07.04	8	FAS design deficiencies	Rast	1	A499 - Nuclear Services	AHJ NFPA relief	Relief or NCR	50 50		VSS Issues DTS-07-251, -252, -277
39	1.01.18.01.02.05.07.05	8	Locks on PIVs and OS&Y valves	Rast	1	A499 - Nuclear Services	Install locks on PIVs and OS&Y valves	Locks installed	50 50		VSS Issue DTS-07-276
40	1.01.18.01.02.05.07.06	8	DAF-TSR-01 frequency	Kim	1	AC20 - Device Assembly Facility	Revise DAF-TSR-01 frequency from quarterly to monthly to meet NFPA 25	Revised TSR frequency	50 50		VSS Issue DTS-07-276
41	1.01.18.01.02.05.07.07	8	DAF-PRC-SP-04 inspection frequency	Rast	1	A499 - Nuclear Services	Revise DAF-PRC-SP-04 inspection frequency from quarterly to monthly to meet NFPA 25	Revised procedure	50 50		VSS Issue DTS-07-276
42	1.01.18.01.02.05.07.08	8	SDD-FPS maintenance and inspection requirements	Rast	1	A499 - Nuclear Services	Revise SDD-FPS to specify maintenance and inspection requirements	Revised DAF-SDD-FPS	50 50		VSS Issue DTS-07-276
43	1.01.18.01.02.05.07.09	8	CW-DAFM.002 SDD-FPS inspection frequency	Rast	1	A499 - Nuclear Services	Revise CW-DAFM.002 SDD-FPS to specify inspection frequency	Revised CW-DAFM.002	50 50		VSS Issue DTS-07-276
44	1.01.18.01.02.05.07.10	8	Drawing 006-DAF-351-A01 inconsistent with as-built configuration	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Update Drawing 006-DAF-351-A01	Updated drawing	50 50		SMP Issue DTS-07-072; Verified configuration as walked down will be captured on revised Fire Protection drawings. Architectural Drawings w/ Fire Protection as built information shall become inactive. Actual Architectural Drawings shall remain active.
45	1.01.18.01.02.05.07.11	8	Annunciator panels	Wehrly	1	G8P0 - Planning and Preparedness	Evaluate/revise current procedures	Evaluated/revised procedures	50 50		SMP Issue DTS-07-120
46	1.01.18.01.02.05.07.12	8	Second floor sprinkler coverage	Rast	1	A499 - Nuclear Services	Submit implementation plan	Plan submitted	50 50		SMP Issue DTS-07-126
47	1.01.18.01.02.05.07.13	8	Fire protection program assessments to G-420.1B-0	Worley	1	G8P0 - Planning and Preparedness	Perform Fire Safety Assessment	Completed assessment	50 50		SMP Issue DTS-07-126

Row Count	WBS	WBS Level	WBS Title	CAM (Responsible Person)	Responsibility Count	Responsible Organization	Scope Description	Deliverables / Milestones	*Earned Value Measurement Technique	End State Condition	Assumptions
48	1.01.18.01.02.05.05	8.0184	DAF FSS Strainer Addition and Modifications	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Determine requirements/ select strainer, write procurement specification, procure appropriate strainer		% complete	Establish documentation necessary to support commercial dedication of strainers	
49	1.01.18.01.02.05.04.08	8.0282	Develop Basis for Strainer Requirements Engineering Support	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Determine requirements/ select strainer, write procurement specification, procure appropriate strainer	Procurement specification	% complete		All criteria is firmly established
50	1.01.18.01.02.05.04.09	8.038	Develop DAF FSS Mods Design Requirements	Millett/Solis	1	AC20 - Device Assembly Facility	Develop DAF FSS Mods Design Requirements	DAF change package	% complete		
51	1.01.18.01.02.05.04.10	8.0478	Develop New DAF FSS Strainer Mods Drawings	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Write 27 ECNs to newly executed configuration management drawings	28 ECNs (approx. 2 drawings per ECN)	% complete		Shall be provided as (Engineering Change Notices in) an Engineering Change Package to the verified walk down revised drawings
52	1.01.18.01.02.05.04.11	8.0575	Validate Engineering Drawings for Strainers	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Incorporate ECP into configuration management drawings upon completion of installation	Incorporation of 27 ECNs	% complete		Installation is complete
53	1.01.18.01.02.05.04.12	8.0673	Develop Construction Work Control Documents	Millett	1	AC20 - Device Assembly Facility	Develop Construction Work Control Documents	Work control documents	% complete		
54	1.01.18.01.02.05.04.13	8.0771	Procure FSS Strainers Engineering Support	Ellsworth/Williar	1	G7P0 - PROJECT ENGINEERING	Engineering to provide procurement specification and support for RFP.	Issue one contract	% complete		Criteria is firmly established
55	1.01.18.01.02.05.04.14	8.0869	Modify / Install DAF FSS Strainers Engineering Support	Cox	1	G411 - Z4 Maint Supervision	Develop Work Packages and install strainers.	Write work package / complete installation of 27 strainers	% complete		
56	1.01.18.01.02.05.06	8.0967	DAF FSS Seismic Analysis	Pedalino	1	A499 - Nuclear Services	Evaluate if the results of the tank inspection above and make an evaluation / recommendation whether or not seismic analysis is feasible	Evaluation Report	% complete	Provide defensable and documented seismic analysis for system and system compents	
57	1.01.18.01.02.05.05.04	8.1065	Perform Seismic Analysis on DAF Tank & Lead-ins	Pedalino	1	A499 - Nuclear Services	Evaluate if the results of the non-destructive testing above and make an evaluation / recommendation whether or not seismic analysis is feasible	Evaluation Report	% complete		
58	1.01.18.01.02.05.05.05	8.1163	Develop Engineering Work Plan for FSS Work	Ellsworth	1	G7P0 - PROJECT ENGINEERING	Develop Engineering Work Plan for FSS Work	Engineering Work Plan	% complete		Scope of work is firmly established
59	1.01.18.01.02.05.05.06	8.1261	Evaluate Available Backup FSS for the DAF	Rast/Ellsworth	1	A499 - Nuclear Services	Engineering and DAF CSE to investigate backup systems and provide alternative solutions	Back-Up FSS Report	% complete		
60	1.01.18.01.02.05.07	8.1359	DAF FSS Reliability Model	Baker	1	AC20 - Device Assembly Facility	Performed by Omicron		% complete	Respond to COA, defend reliability factor basis, provide documented basis for recommenations to NSO	
61	1.01.18.01.02.05.06.04	8.1456	Perform Reliability Analysis of FSS (CoA)	Baker	1	AC20 - Device Assembly Facility	Performed by Omicron		% complete		
62	1.01.18.01.02.05.06.05	8.1554	Time Phased Coal Tar Analysis Report	Baker	1	AC20 - Device Assembly Facility	Sub contractor		% complete		
63	1.01.18.01.02.05.06.06	8.1652	Perform Analysis on Coal Tar Sloughing	Baker	1	AC20 - Device Assembly Facility	Sub contractor		% complete		
64	1.01.18.01.02.05.08	8.175	VSS/SMP DTS Issues		1	A499 - Nuclear Services				Address issues identified in DTS, provide documented closure of DTS issues	
65	1.01.18.01.02.05.07.14	8.1848	Revise DSA /TSR	Kim	1	AC20 - Device Assembly Facility	Revise DSA /TSR to clarify FSS delivery requirements and define FSS safety boundary.	Revised DSA /TSR	50 50		VSS Issues DTS-06-283, -284, -286, -287, -288 Dependent on hydraulic calcs
66	1.01.18.01.02.05.07.15	8.1946	Revise DAF-SDD-FPS	Rast	1	A499 - Nuclear Services	Revise DAF-SDD-FPS, to clarify FSS delivery requirements and define FSS safety boundary.	Revised DAF-SDD-FPS	50 50		VSS Issues DTS-06-283, -284, -286, -287, -288 Dependent on hydraulic calcs

APPENDIX D. PROJECT SCHEDULE

Data Date 28JUL08 | DAF Schedule

Activity ID	Activity Description	Orig Dur	%	Early Start	Early Finish
DAF Fire Suppression System					
+ Project Management & Support 5.01					
		336	16	16JUN08A	30SEP09
+ DAF Engineering Studies And Tests 5.02					
		137	25	24MAR08A	20NOV08
+ DAF FSS Walk Down & Hydraulic Calculations 5.03					
		100	63	07APR08A	20AUG08
+ DAF FSS Strainer Addition & Modifications 5.04					
		161	5	29MAY08A	16MAR09
+ DAF FSS Seismic Analysis 5.05					
		76	37	23JUN08A	07OCT08
+ DAF FSS Reliability Model 5.06					
		129	0	24MAR08A	06NOV08
+ Other FSS Open Issues 5.07					
		430	3	28FEB08A	27OCT09



Early Bar
Progress Bar
Critical Activity

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D844

National Security Technologies (LLC)
DAF Schedule
DAF FSS Schedule

Sheet 1 of 1 | DAF FSS Schedule | Fire Suppression System

APPENDIX E. RISK MANAGEMENT AND RISK REGISTER

E.1 Introduction

The FSSRP utilizes a coordinated risk mitigation process, which includes risk management roles and responsibilities, the identification and prioritization of risks to project execution, and the development of mitigation strategies.

The goal is to ensure that significant key risk factors that could affect either the ultimate success of the project or the continuity of programmatic activities are identified and appropriately managed throughout the entire project lifecycle.

E.2 Roles and Responsibilities

All project personnel will work together to minimize risk. The Project Manager is ultimately responsible for the overall success of the project and, therefore, for ensuring that all risk elements are adequately managed. The Project Manager will direct the identification, evaluation, and mitigation of project-related risk and will work closely with the project team to establish mitigation priorities.

The PM will also be responsible for:

- Leading the project team in the identification and evaluation of project-related risks and in the development of mitigation strategies
- Leading the implementation of mitigation strategies
- Leading periodic risk reviews
- Ensuring that risk assessments and mitigation strategies are appropriately documented

E.3 Risk Management Process

The risk management process includes the following four elements:

- Risk identification
- Risk analysis
- Risk mitigation
- Risk tracking, reporting, and change control

This process is designed to direct attention and resources to risk scenarios, which could significantly impact the cost and schedule of the FSSRP.

E.3.1 Risk Identification

FSSRP activities were evaluated to determine risk scenarios and their potential effects on project scope, schedule, and budget and how project activities might affect or be affected by DAF operations. To facilitate the process, activities were reviewed within pre-determined categories and entered in a risk register. Categories used for the FSSRP are Cost, Schedule, Technical / Performance, and Programmatic. The initial identification of risk for this project was accomplished by compiling input from subject matter experts and project team personnel.

E.3.2 Risk Analysis

Both the probability that a given risk scenario would occur during this project and the consequence for each risk scenario were evaluated qualitatively as either “Low”, “Medium”, or “High”. In an effort to gain consistency in the relative ranking of consequence, evaluation criteria were developed for each risk category and are presented in Table9. The relative risk matrix used for this project is presented in Table 10 and the analysis results for each identified risk were captured in the risk register.

Table 9. Consequence Ranking Criteria

Rank	Risk Category	Evaluation Criteria
Low	Cost	Minimal impact to planned budget.
	Schedule	Minimal adjustment needed to meet project objectives. Milestone delays would be minimal.
	Technical/Performance	Technical and/or performance requirements are minimally impacted.
	Programmatic	Ability to meet commitments is minimally impacted.
Medium	Cost	Moderate impact to planned budget.
	Schedule	Moderate adjustment needed to meet project objectives. Milestone delays would be moderate.
	Technical/Performance	Technical and/or performance requirements are moderately impacted.
	Programmatic	Ability to meet commitments is moderately impacted.
High	Cost	Significant impact to planned budget.
	Schedule	Significant adjustment needed to meet project objectives. Milestone delays would be significant.
	Technical/Performance	Technical and/or performance requirements are significantly impacted.
	Programmatic	Ability to meet commitments is severely impacted.

Table 10. Relative Risk Matrix

Probability of Occurrence	Consequence		
	Low	Medium	High
High	Medium Risk	High Risk	High Risk
Medium	Low Risk	Medium Risk	High Risk
Low	Low Risk	Low Risk	Medium Risk

E.3.3 Risk Mitigation

Four strategies are generally available to respond to any risk:

Avoidance — Eliminate the source of risk, generally through a fundamental change in requirements or specifications. This is the most desirable strategy when conditions permit.

Transfer — Reallocate of all or part of the risk to another party or by taking collateral actions to move the risk to another part of the project by reconfiguring systems or requirements as a means of reducing the overall risk to the project.

Control — Decrease the likelihood of occurrence of a risk scenario and mitigate the potential consequence.

Acceptance — Acknowledge that the risk exists, forego mitigation efforts, and consciously decide to accept the consequence should the scenario occur.

A risk mitigation strategy was developed for each FSSRP-related risk ranked as either high or medium and was captured within the risk register. Mitigation strategies for risk items ranked low were developed at the discretion of the Project Manager. The overall risk-mitigation strategy for this project was also captured within the risk register through a prioritization of risk mitigation strategies, the development of mitigation actions and a schedule for implementation of those strategies, and the identification of risk owners responsible for implementation.

E.3.4 Risk Tracking, Reporting, and Change Control

The FSSRP will include the analysis and tracking of risk items within the Risk Register. Risk status is expected to be actively discussed during routine project meetings and to be addressed in all project status reports. The Risk Register is a living document that will be will be reviewed and updated frequently during project execution.

The procedure to revise the Risk Register includes:

- An evaluation of the risk ranking and mitigation actions for previously identified risk.
- Incorporation of newly identified risk.
- Status changes to existing risk.
- Identify specific mitigation strategy and path forward for any residual risk identified as either medium or high.
- Redistribute revised Risk Register to project team members.

E.3.5 FSSRP Risk Register

The risk register used by the FSSRP project team to track risk items is provided on the following pages.

DAF Fire Suppression System Reliability Project (FSSRP) Risk Register

Item #	Trigger (if this happens)	Risk Description/Scenario	Before Mitigation				Risk Controls/Mitigation	After Mitigation				Risk Owner
			Probability	Consequence	Risk	Strategy*		Probability	Consequence	Risk	Cost of Mitigation	
Authorization Basis												
AB-1	USQD required for each task that requires contact work	Project schedule delays due to USQD process not completed and approved in timely manner	M	H	H	C	Develop plan and review project tasks to ensure that USQD process defined for all expected tasks requiring contact work	L	H	M		Senior Authorization Basis Analyst
Fiscal												
F-1	Original budget level does not meet actual cost required to complete project activities	Initial funding level may be inadequate to meet all project requirements beyond FY08	L	H	M	C	Some project requirements may extend FY09 (e.g., do not replace all strainers immediately)	L	M	L		Project Engineering
F-2	Extent of repairs required on the FSS water tank much larger than anticipated	Cost associated with repairing tank is too high to justify repairing rather than replacing the tank or tank is in such poor condition repairs can not be made.	M	H	H	C	Develop a trade study with cost/benefit analysis to determine whether repair or replacement is warranted	M	M	M		Project Engineering
F-3	Results of Hydraulic Calculations shows that the FSS does not meet NFPA 13 code	Unanticipated engineering and construction upgrades to the FSS infrastructure will be required	M	H	H	C	Develop detailed cost estimate and to request additional funding to upgrade FSS	M	M	M		Project Engineering
F-4	NSO requires review and approval of proposed changes with a cumulative cost greater than $250,000	Delay in starting proposed activities while awaiting NSO approval	M	H	H	A	No mitigation other than to request one week turn-around on approval	M	H	H		Project Manager
Resources												
R-1	Unable to qualify vendor(s) with the necessary capability to inspect and repair tank and to complete procurement cycle timely	Unable to meet tank inspection and repair schedule	L	H	M	C	Sources sought process already underway and a single strong candidate has provided qualifications – Continuing search for additional vendors with appropriate capabilities and qualifications	L	M	L		Procurement / Project Engineering
R-2	Unable to qualify vendor(s) with the necessary capability to conduct the Coal Tar Analysis and to complete procurement cycle timely	Unable to meet the Coal Tar Analysis schedule and ultimately affecting the completion of the Reliability Analysis Report	M	H	H	C	Piece-meal tasks among numerous vendors – more responsibility on NSTec personnel	L	M	L		CSE Fire Protection Engineer

Item #	Trigger (if this happens)	Risk Description/Scenario	Before Mitigation				Risk Controls/Mitigation	After Mitigation				Risk Owner
			Probability	Consequence	Risk	Strategy*		Probability	Consequence	Risk	Cost of Mitigation	
R-3	with NTRL approved strainers that meet the required specifications and quality standards and to complete procurement timely	Unable to develop a list of qualified vendors and to procure strainers that meet the required quality standards creating a slip in strainer installation schedule	M	H	H	C	Do not require full Quality review of vendor to qualify them; instead use **"Commercial grade dedication"** by NSTec (more effective because of limited number of strainers to be procured)	L	M	L		Procurement & Project Engineering
R-4	Insufficient number of qualified resources to complete Hydraulic Calculations - Minimal number of personnel with skills	Unable to meet the Hydraulic Calculations schedule and ultimately affecting the completion of the Reliability Analysis Report due to internal resource(s) availability. Failure to complete calculations by due date has significant consequence because of interdependencies with DSA implementation	L	H	M	C	Contingency Plans - Backup resources in queue	L	M	L		Project Engineering
R-5	Reliability input data is not provided in sufficient time to perform the analysis	Unable to meet the Reliability Model development schedule due to data not being provided to Reliability Model development subcontractor (Omicron)	L	H	M	C	Ensure data is transferred in a timely manner and monitor progress of model development	L	M	L		Project Manager
			Schedule									
S-1	Unable to effectively coordinate FSSRP with DAF Operations	Unable to coordinate FSSRP tasks with DAF Integrated Schedule	M	H	H	C	Coordinate FSSRP activities weekly with DAF Facility Manager	M	M	M		Project Manager
			Environmental, Safety & Health									
E-1	Conduct ES&H evaluations for each activity as project progresses	Discovery of unknown ES&H issues	L	H	M		Conduct ES&H Hazards Analysis, Security Activities Analysis, NEPA Checklist, REOP Risk Checklist, and Site/Facilities Hazard Analysis / Classification early in Phase 1	L	M	L		Project Manager
			Waste Management									
W-1	Conduct waste analysis	Significant waste generated during tank inspection/repair activities (e.g., potential sandblast material/residue from tank)	M	M	M		Evaluate process to determine waste stream type and quantity	L	L	L		Project Engineering
			Training and Qualifications									
T-1	Subcontractor training insufficient	Personnel training and qualifications required for subcontractors (e.g., site access/GET)	L	L	L	A	Monitor	L	L	L		Procurement

* Strategy: Av-Avoid, T-Transfer, C-Control, A-Accept

APPENDIX F. MONTHLY REPORT (SAMPLE)

FACILITY TRANSITION PROJECT QUAD REPORT

PROJECT INFORMATION

Site: Nevada Test Site

FPD Assessment
Green

Title: NTS Facilities Transition Project

Federal Project Director: Lisa Mueller
Contractor: National Security Technologies, LLC
Project Manager: Patrick S. Morris

	Estimated Cost ($k)	Progress
Phase I (Planning Phase)	$250 k	Complete
Phase II (REOP Transition)	$4,959 k	*In Progress
Post Transition Activities	$2,065 k	
TOTAL Project Budget	$7,274 k	

Project Narrative Description: Transfer of responsibility for facility management of NWL-owned facilities to the NTS M&O contractor; includes 3 phases.
Phase I (Planning Phase): Phase I encompasses developing the project baseline including identifying scope, cost and schedule and writing the Project Execution Plan (PEP). This phase is complete.

Phase II (REOP Transition): Phase II encompasses development of new NSTec primary REOPs, revision to or creation of new secondary REOPs. This also includes the blue sheeting of all performance documents and other documents relating to the facilities. Phase II also includes contract modifications, new or revisions to current facility security plans, IT transition and Human Capital dealings. When a specific facility has been transitioned that facility will immediately begin post transition activities.
*There was $395k in scope added to the Phase II baseline to facilitate the transfer of issues from the DTS to CaWeb, no new funding was requested.

Post Transition Activities: Removal of NWL dependencies from each facility's authorization basis.

RISK MANAGEMENT

Risk: New: Existing: X
If clearance and HRP (DAF) are not transferred concurrent to transition, loss of critical staffing could lead to work stoppages
Planned Action:
Clearance and HRP transfers is a standard NSTec HR process that is utilized successfully today. Continuous communication and coordination with NSTec HR, WSI HR and NWLs security representatives required. Possible mitigation for issues involve NSO Safeguards & Security.

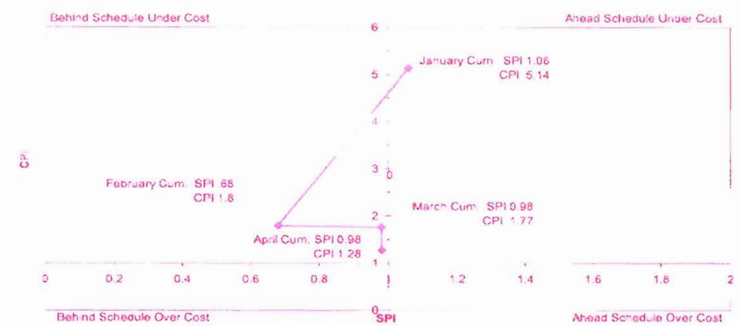
Risk: New: Existing: X
Current NWL subcontracts supporting facilities terminated upon facility transition could result in loss of seismic SME, CEF start-up commitments, and ability to maintain safety bases.
Planned Actions:
Subcontracts to be identified by NSTec facility leads prior to REOP turnover and either renegotiated or new contracts established.

Risk: New: X Existing:
LLNL may RIF several JNPO employees that have accepted positions with NSTec prior to their hire dates at NSTec, thus creating a coverage gap at the facilities.
Planned Actions:
This is a new risk and as of this time the impacts and mitigations for this risk are under investigation.

PHASE II COST & SCHEDULE PERFORMANCE

Monthly Cost and Schedule Indices

April 2008



	BCWS	BCWP	ACWP	CV in $	SV in $	CPI	SPI
Current	$929,899	$919,659	$1,221,381	-$301,722	-$10,240	0.75	0.99
Cum	$3,289,049	$3,232,850	$2,528,904	$703,946	-$56,199	1.28	0.98

FACILITY/PROJECT PERFORMANCE

Transition WBS	Assessment
DAF	Green
U1a	Green
JASPER	Green
HE Facilities	Yellow
General Facilities	Green
IT	Green
Issue Management	Green
Security	Green
Contracts	Green

Phase 2 Complete

Legend
Green - No Attention Required
Yellow - Requires Some Attention
Red - Attention Required

U1a - The phase 2 activities were completed and the facility was transitioned on March 31, 2008 more than 30 days ahead of schedule.
DAF - The DAF transition is continuing on schedule for a transition date of June 2, 2008.
General Facilities - The General Facilities transition team is on schedule to complete the transition of all facilities by mid May. The team has recovered their performance variance from February and March.
JASPER - The JASPER transition team is on schedule and under budget.
HEF - The HEF team started transition activities in April. Due to conflicts with programmatic activities the transition activities are slightly behind schedule. Concern is starting to increase over de-conflicting programmatic activities with facility transition activities.

APPENDIX G. ACRONYMS

<u>Term</u>	<u>Definition</u>
AB	Authorization Basis
BCP	Baseline Change Proposal
BCR	Baseline Change Request
CM	Configuration Management
COA	Condition of Approval
CSE	Criticality Safety Evaluation
DAF	Defense Assembly Facility
DE&SS	Defense Experimentation and Stockpile Stewardship
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
DTS	Deficiency Tracking System
ECCB	Executive Configuration Control Board
EM	Environmental Management
ESH&Q	Environment, Safety, Health, and Quality
FSSRP	Fire Suppression System Reliability Project
HASS	Hydraulic Analyzer of Sprinkler Systems
HR	Human Resources
HS&DA	Homeland Security and Defense Applications
IPT	Integrated Project Team
JCO	Justification of Operations
LOE	Level of Effort
M&I	Management and Integration
M&O	Management and Operations contract
MEL	Master Equipment List
MSIP	Management System Improvement Project
NDE	Non-destructive Examination
NEO	Nuclear Explosive Operations
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NNSA	National Nuclear Security Administration
Non-DNFO	Non-Defense Nuclear Facilities Office
NRTL	Nationally Recognized Testing Laboratories
NSO	Nevada Site Office
NSTec	National Security Technologies LLC
NTS	Nevada Test Site
PEP	Project Execution Plan
PM	Project Management/Project Manager
PMO	Project Management Office
QA	Quality Assurance
REOP	Real Estate/Operations Permit
RTBF	Readiness in Technical Base and Facilities
SDD	System Design Description
SOW	Scope of Work
SSC	Structures, Systems, and Components
TSR	Technical Safety Requirements
VSS/SMP	Vital Safety Systems/Safety Management Program
WBS	Work Breakdown Structure

DISTRIBUTION

National Security Technologies LLC	**(NSTec)**
Andrews, Tom	NLV134
Baker, Gary	NLV101
Calovini, Joe	NTS220
Campbell, Roy	NTS212
Ellsworth, Paula	NLV085
Kramer, Aaron	WSI
Leo, Dawn	212
Millet, Melvyn R.	212
Montoya, Lloyd	NLV101
Morris, Patrick	NLV066
O'Neil, Jim	212
Pedalino, Jim	NTS220
Ploeger, Terry	212
Post, Dave	NLV101
Rast, Jim	NTS220
Watters, Charles	(DAF)
Williamson, Tom	NLV018
Wilson, Perry	212
Ziehm, Sue	212

Enclosure 3

DAF Fire Suppression System

David J. Post
Division Leader

April 17, 2008

T100EEU042307

FSS Plan Process

ISSUES

- DNFSB LETTER January 18, 2008
- NSO SMP/ VSS Assessment
- DAF DSA Annual Update COAs
- DNFSB REC 2008-1

→

BINS

- Reliability
- Coal Tar
- Hydraulics
- Operability
- Hardware

→

APPROACH

- Calculations
- Reliability
- Flushing
- Strainers
- Coal Tar
- Flow Test
- Determine Path Forward

→

FSS PROJECT PLAN

- Resource Loaded Schedule
- Project Execution Plan
- Assigned PM
- Preliminary Budget $2.5 Million

T100EEU042307

FSS Issues (Examples)

DNFSB Letter	Reliability, SC design, VSS assertions, piping integrity, compensatory measures, flushing procedures, straining, tracking and trending , water supply, FP assessment.
SMP/VSS Assessment	Coal tar study, straining, flushing procedures, tracking and trending, hydraulic calculations, system corrosion, SC boundary, NFPA code deficiencies.
DAF DSA Annual Update	Reliability, hydraulic calculations, water tank as a SC system.
DNFSB Recommendation 2008-1	Safety Class design criteria, operability.

FSS Approach

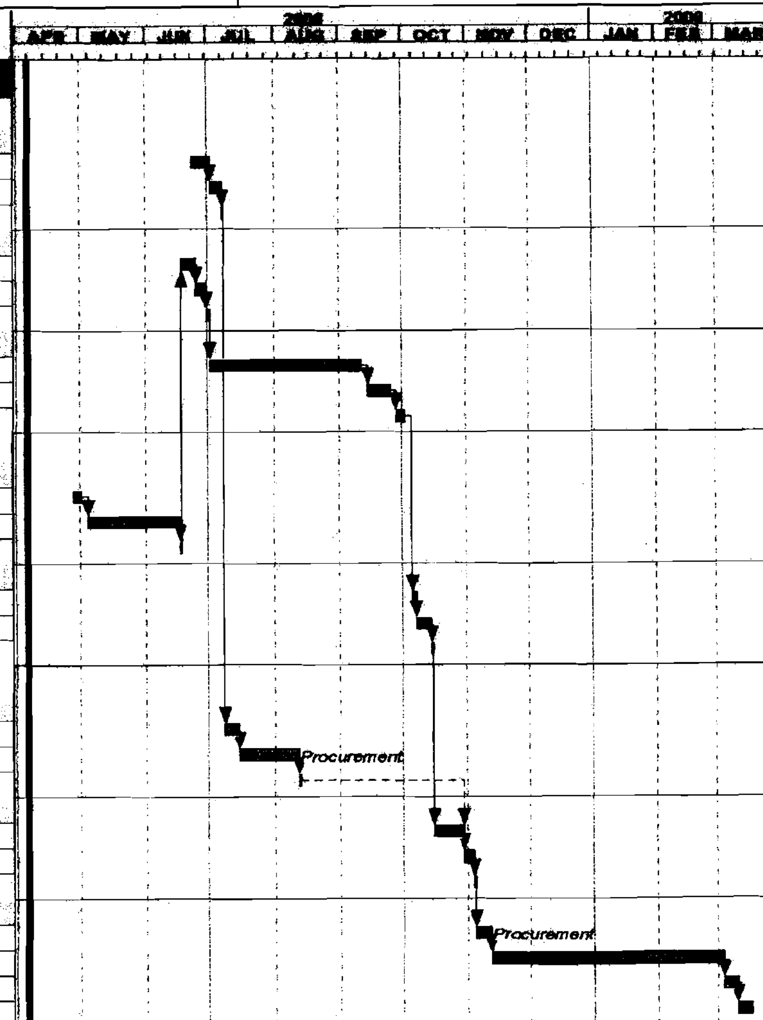
- Perform Hydraulic Calculations
- Perform Reliability Analysis
- Conduct Lead-in Piping Flushing Analysis
- Strainer Replacement Project
- Coal Tar Study
- Flow Testing
- Gather Results and Determine Needed Approach

FSS Strainer Improvements

Issue:	Current strainers employed within the FSS are not NRTL approved.
Action:	Perform engineering design, purchase and installation of NRTL approved strainers with sufficient capacity to capture debris that would impair the sprinkler heads. Update/Revise hydraulic flow calculations.
Reason:	Achieve NRTL compliance
Schedule:	24 June 2008 – 17 March 2009

FSS DAF Strainers Improvement

Data Date	07APR08	Offical Use Only (OUO)				DAF Schedule
Activity ID	**Activity Description**	**Orig Dur**	**Rem Dur**	**%**	**Early Start**	**Early Finish**
DAF Fire Suppression System						
Fire Suppression System Doc Reviews and Anaylsis						
Develop Basis for Strainer Requirements						
BAFS1030	Draft Basis for Strainer Requirements	5	5	0	24JUN08	01JUL08
BAFS1032	Review Basis for Strainer Requirements	2	2	0	02JUL08	07JUL08
BAFS1034	Approve & Issue Basis for Strainer Requirements	1	1	0	08JUL08	08JUL08
Develop DAF FSS Mods Design Requirements						
BAFS1050	Draft FSS Mods Design Requirements	5	5	0	18JUN08	25JUN08
BAFS1052	Review Draft FSS Mods Design Requirements	2	2	0	26JUN08	30JUN08
BAFS1054	Approve and Issue FSS Mods Design Requirements	1	1	0	01JUL08	01JUL08
Develop New DAF FSS Strainer Mods Drawings						
BAFS1060	Develop New DAF FSS Strainer Mods Drawings	40	40	0	02JUL08	11SEP08
BAFS1062	Review New DAF FSS Strainer Mods Drawings	8	8	0	15SEP08	25SEP08
BAFS1064	Approve & Issue DAF FSS Strainer Mods Drawings	4	4	0	29SEP08	02OCT08
Fire Suppression System Facility Work						
Walk Down Facility Risers & Sprinklers						
BAFS2010	Develop WP for Walk Down Risers & Sprinklers	4	4	0	28APR08	01MAY08
BAFS2012	Walk Down FSS Risers & Sprinklers	24	24	0	05MAY08	16JUN08
BAFS2014	Submit Walk Down Markups to Engineering	1	1	0	17JUN08	17JUN08
Validate Engineering Drawings for Strainers						
BAFS2020	Develop WP for Validation of Strainer Drawings	2	2	0	06OCT08	07OCT08
BAFS2022	Perform Field Validation of Strainer Drawings	4	4	0	08OCT08	14OCT08
BAFS2024	Submit Validation Drawings to Engineering	1	1	0	15OCT08	15OCT08
Fire Suppression System Procurement/Construction						
Procure FSS Strainers						
BAFS3010	Develop Procurement Package for FSS Strainers	4	4	0	09JUL08	15JUL08
BAFS3012	Procure FSS Strainers	16	16	0	16JUL08	12AUG08
BAFS3014	Receipt Inspect FSS Strainers and Stage for Inst	1	1	0	13AUG08	13AUG08
Develop Construction Work Control Documents						
BAFS3020	Draft Construction WP for FSS Modification	8	8	0	16OCT08	29OCT08
BAFS3022	Review Construction WP for FSS Modification	2	2	0	30OCT08	03NOV08
BAFS3024	Approve Construction WP for FSS Modification	1	1	0	04NOV08	04NOV08
Modify / Install DAF FSS Strainers						
BAFS3060	Procure Services for FSS Modification	5	5	0	05NOV08	12NOV08
BAFS3062	Modify/ Install FSS Stainers	60	60	0	13NOV08	03MAR09
BAFS3064	Close-out Construction WP for FSS Modifications	4	4	0	04MAR09	10MAR09
BAFS3066	Asbuild FSS Drawings	4	4	0	11MAR09	17MAR09



FSS Reliability Analysis

Issue: Analysis is needed to provide technical basis of 90% reliability of FSS. Schedule is needed to improve reliability of FSS.

Action: Perform a RELIABILITY Analysis to establish a technical baseline.

Reason: Provide a technical basis for the DSA/TSR and FSS system boundary.

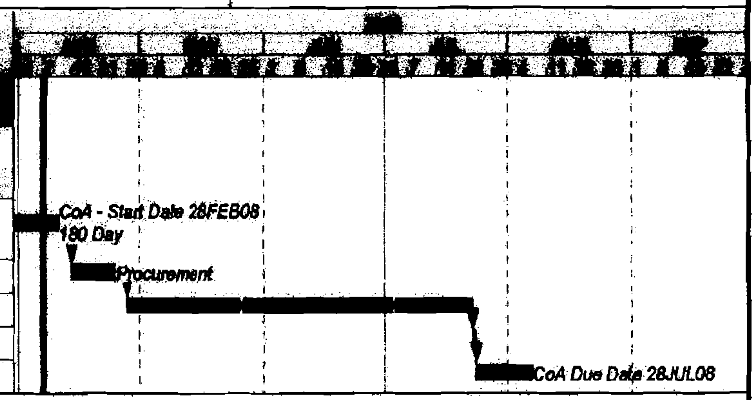
Provide input for determining subsequent decisions on FSS repairs/modifications/upgrades.

Schedule: 28 February 2008 – 28 July 2008

T100EEU042307

FSS Reliability Analysis

Data Date	07APR08	Offical Use Only (OUO)					DAF Schedule
Fire Suppression System Doc Reviews and Analysis							
Perform Reliability Analysis of FSS (CoA)							
BAFS1090	Draft Reliability Analysis Requirements for FSS	8	4	80	24MAR08A	10APR08	
BAFS1092	Procure Services for FSS Reliability Analysis	8	8	0	14APR08	24APR08	
BAFS1094	Perform FSS Reliability Analysis	48	48	0	28APR08	22JUL08	
BAFS1096	Submit FSS Reliability Analysis to CSE	1	1	0	23JUL08	23JUL08	
BAFS1098	Perform Indep. Rev. of FSS Reliability Analysis	8	8	0	24JUL08	08AUG08	



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Hydraulic Calculation

Issue:	Hydraulic calculation is needed to provide technical basis to support DAF FSS water pressure value. Hydraulic calculation needed to address water density requirement.
Action:	Perform hydraulic calculation utilizing the validated hydraulic model Hydraulic Analyzer Sprinkler Systems (HAAS).
Reason:	Provide a calculated flow rate and pressure analysis for the DAF FSS per NFPA-13.
Schedule:	31 March 2008 – 13 May 2008

FSS Flushing Test Surveillance

Issue: There are no quantitative criteria for a pass/fail on FSS flush tests.

Action: Change the existing surveillance flushing procedure to incorporate quantitative pass/fail criteria.

Reason: Provides empirical basis for determining whether a facility FSS passes or fails the surveillance requirement rather than relying on best engineering judgment.

Schedule: 21 April 2008 – 21 April 2008

17 March 2009 – 17 March 2009 (post strainer installation)

Water Tank

Issue:	The DAF FSS water tank is not within the FSS safety class boundary.
Action:	Incorporate FSS water tank within the FSS safety class boundary. Inspect and repair/replace (as determined by inspection results).
Reason:	Place water tank within the boundaries of the FSS system. Improve reliability of the FSS.
Schedule:	May 2008 November 2008 (repair/replace decision)

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Coal Tar

Issue:	Coal tar is sloughing from the FSS lead-in pipes.
Action:	Analyze coal tar sloughing mechanism. Perform a time phased analysis of the collected coal tar debris. Perform NDE analysis of lead-in pipes.
Reason:	To understand the coal tar release process within the lead-in pipes to assess further actions to be undertaken. To determine the characteristics of the debris to assess potential corrosion issues. Incorporated with other data/analysis assist in making a decision on path forward for lead-in CAs.
Schedule:	28 April 2008 – 23 June 2008

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Flow Tests

- Issues:
  - Conduct flow Tests Beyond Strainers to determine water delivering capacity to the Sprinkler system
- Actions:
  - Develop Flow Procedures for Post Straining Testing
- Reasons:
  - Provide Data to Support Sprinkler System Demand
  - Determine what debris may pass through the strainers and potentially impare the Sprinkler Head Flow Demand
- Schedule:
  - April 24, 2008 – August 30, 2008

FSS Operability

- FSS operability and the means to demonstrate it are found in DAF-TSR-01, Rev. 5, 9-6-2005, section 3 / 4.4, "Fire Suppression System LCO and Surveillance Requirement."

- TSR is robust.
  - SR 4.4.6, "Perform system flush" conducted in August 2007, resulted in four buildings having FSS declared inoperable and PISA submitted in September 2007.

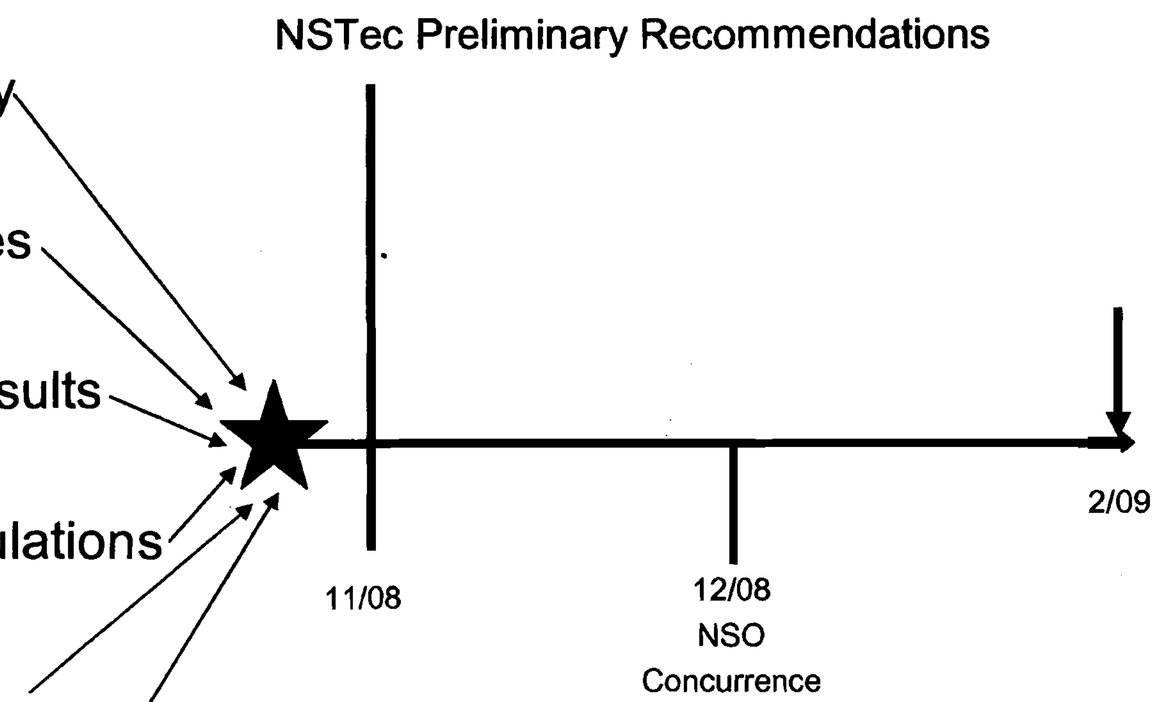
- Occurrence Report NA-NVSQ-LLNV-2007-0007, "Potential Impact on FSS Operability because of Increasing Coal Tar (PISA)"
  - Corrective action 1: Increase FSS Flushing Surveillance from every two years to annually. Completed 1 November 2007.

FSS Decision Point

<u>Inputs</u>

- Reliability Study
- Coal Tar Studies
- Water Tank Results
- Hydraulic Calculations
- Strainer Design
- Flow Test Results

<u>Decision Points</u>



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DAF FSS Project Path Forward

- Resolution of Fire Suppression System issues being managed as a project
- Structured path forward which addresses current short term actions and will propose interim and long term alternatives
  - Hydraulic Calculations
  - Reliability Analysis
  - Strainers Replacement
- FSS operability being monitored as dictated in the DAF safety basis

T100EEU042307

A.J. Eggenberger, Chairman
John E. Mansfield, Vice Chairman
Joseph F. Bader
Larry W. Brown
Peter S. Winokur

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700 Washington, D.C. 20004-2901
(202) 694-7000

January 18, 2008

The Honorable Thomas P. D'Agostino
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

ACTION	golden
INFO	NST (R.T. BROCK) AMNS
NSO/MGR	✓
AMEM	
AMNS	✓
AMSO	
AMSS	

Dear Mr. D'Agostino:

The Device Assembly Facility (DAF) at the Nevada Test Site continues to implement planned activities that expand its mission, including receipt, storage, and operations involving special nuclear material; nuclear explosive operations; and the installation of equipment to perform potential criticality experiments. The Defense Nuclear Facilities Safety Board (Board) has identified major issues with the safety related fire suppression system. These issues call into question the ability of the system to perform reliably in case of need. The Board has previously expressed concerns with respect to the reliability of the DAF fire suppression system in letters to the National Nuclear Security Administration (NNSA) dated November 3, 2004, and November 28, 2005. The fire suppression system deficiencies raised in those letters remain largely unaddressed.

The Board's staff recently conducted a review of fire protection at DAF and identified several significant issues concerning the availability and reliability of safety-class and safety-significant fire protection features. The fire suppression system does not meet the typical design features for a safety-class system, e.g., redundancy to preclude a single active failure or a safety-significant system. In addition, the potential for impairment of the existing fire suppression system is not clearly defined in the DAF safety basis. These issues are documented in the enclosed report.

In the past year, the Nevada Site Office conducted vital safety system reviews, safety management program assessments, and a review of the draft update to the DAF safety basis. These efforts have also identified a list of deficiencies in the fire protection system at DAF.

The Board is especially concerned about the continuing degradation of the underground piping that supplies water to the DAF fire protection system. This degradation results in unacceptable amounts of debris in the water supply, which can adversely impact the fire protection system. The Board does not believe that periodic flushing and cleaning of strainers is an adequate strategy ensuring that the fire protection system will perform as anticipated in the

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
Staff Issue Report

November 20, 2007

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: C. March
J. Deplitch

SUBJECT: Fire Protection at the Device Assembly Facility

This report documents a review conducted by the staff of the Defense Nuclear Facilities Safety Board (Board) of fire protection at the Device Assembly Facility (DAF) at the Nevada Test Site. To perform this review, staff members C. March and J. Deplitch met with representatives of the Laboratory Joint Nevada Test Site Program Office, Lawrence Livermore National Laboratory, National Security Technologies, LLC, and the National Nuclear Security Administration's Nevada Site Office (NSO).

Background. DAF was designed in the 1980s, with construction of the facility beginning in April 1988. Lawrence Livermore National Laboratory and Los Alamos National Laboratory took beneficial occupancy in 1996, and operations began in 1998.

DAF has a fire protection program as required by Department of Energy Order 420.1A, *Facility Safety*. Passive protection features incorporate 2-hour rated fire barriers between the various DAF buildings, creating separate fire areas, while active fire suppression consists of automatic sprinklers. The water supply for DAF is provided by a 250,000 gallon on-ground steel water storage tank located on a hill approximately 0.5 miles behind and 230 feet above DAF. A single 12-inch diameter main feeds a 10-inch diameter cement-lined ductile iron underground distribution loop, providing domestic potable, industrial, and firefighting water to DAF.

All buildings (except the parking garage, Building 510) are currently protected by automatic sprinkler systems. The systems in buildings that would support nuclear explosive operations are designated safety-class, while the systems in buildings for the downdraft table, glovebox, and Criticality Experiments Facility are designated safety-significant. DAF also has a fire alarm system to warn personnel of fires, radiation alarms, security intrusions, or gas attacks in the facility. Should any of these threats occur, the fire alarm system would respond with audible and visual warnings unique to the threat. Both levels of DAF are also provided with portable fire extinguishers and equipped with wet standpipe systems for use by the Nevada Test Site fire department.

- The strainers used to collect foreign material in the flush water do not necessarily have the same mesh size as the strainers installed in the risers. In many cases, the perforations of the test strainer are larger than those of the permanent riser strainer. This test arrangement captures less material than do the permanent strainers and does not reflect the potential for plugging of the permanent strainers. Further, there is an unknown quantity of debris passing through the test strainer, resulting in an underestimate of how much lining or corrosion products are being removed to protect the risers.

- While some flow data are collected, the procedure does not establish minimum flushing rates to obtain a minimum velocity of 10 feet per second as recommended in NFPA 13 and NFPA 25.

- There are no acceptance criteria to evaluate whether the quantity of debris collected during a flush warrants considering the system failed and/or requiring more frequent flushing. Decisions are based on the judgment of the system engineer, which appear qualitative and arbitrary.

- Annual flushing for the underground lead-ins was originally established in 1995 and continued through 2005. With implementation of the DAF Documented Safety Analysis (DSA) and the associated Technical Safety Requirements (TSRs), the frequency of flushing for all systems was changed to every 2 years, but no technical justification was provided for the schedule change.

Tracking and Trending of Underground Lead-in Flushing. Foreign material collected during the flushing operations performed since 1995 has been retained; however, no formal tracking or trending of the available data had been conducted until this year. This process is being conducted on an ad hoc basis, with the quantity of lining, collected by building, being entered into a system engineer's spreadsheet. While this information is useful, additional evaluation may be warranted. The staff's observations on other tracking and trending issues are summarized below:

- The 2007 data collected to date indicate a noticeable increase in the foreign material collected for some systems, and a significant increase for five systems. This situation needs to be evaluated to determine the appropriate course of action for future flushing.

- The material collected from some buildings appears to have changed from liner material to mineral nodules, scale, and iron oxide particles, indicating the likelihood of significant corrosion of the piping material. The impact of such corrosion may be significant.

- Several life safety deficiencies had been identified, but not documented with appropriate exemptions or equivalencies.

- The contractor's assessment process for the fire protection program was not comprehensive.

- The fire detection system for one building with a safety-class sprinkler system is not designated as safety-class, even though its failure would prevent the operation of the sprinkler system's capabilities.

NSO and DAF management are working to develop an acceptable corrective action plan for all of the findings of the NSO assessments.

Update of Documented Safety Analysis. The second update to the DAF DSA and TSRs approved in December 2003 is being developed. The update is a major revision of the DSA and TSRs. NSO has provided comments on the draft update, including comments on the fire protection system that are consistent with the findings of its assessments. NSO's comments address the reliability and vulnerabilities of the fire suppression system, the availability of the water supply, and the advisability of considering the water supply system a safety system.

The contractor's resolution of NSO's comments includes adding to the TSRs a specific administrative control for an 8-foot standoff distance between combustible materials and high explosives, as well as daily surveillance of the riser pressure. The 8-foot standoff distance is consistent with practice at the Pantex Plant, although the content and quantity of combustible material appear to be undefined. Riser pressure will provide some indication of the availability of water, although it will not provide verification of an adequate water flow. While the addition of these specific administrative controls represents an improvement, the Board's staff believes they should be treated as compensatory measures until deficiencies of the engineered controls are corrected, and defined as defense-in-depth thereafter.

Conclusion. The fire suppression system at DAF does not meet the expectations of a safety-class or safety-significant system. Numerous deficiencies have been identified, and the potential for impairment of the system is not clearly identified in the DAF DSA. These findings and deficiencies need to be explicitly acknowledged in the authorization basis, and appropriate compensatory measures instituted pending completion of corrective actions. This should be completed before more hazardous nuclear operations, e.g., nuclear explosive operations or criticality experiments, begin at DAF.

Enclosure 3

DAF Fire Suppression System

David J. Post
Division Leader

April 17, 2008

T100EEU042307

FSS Plan Process

ISSUES

- DNFSB LETTER January 18, 2008
- NSO SMP/ VSS Assessment
- DAF DSA Annual Update COAs
- DNFSB REC 2008-1

→

BINS

- Reliability
- Coal Tar
- Hydraulics
- Operability
- Hardware

→

APPROACH

- Calculations
- Reliability
- Flushing
- Strainers
- Coal Tar
- Flow Test
- Determine Path Forward

→

FSS PROJECT PLAN

- Resource Loaded Schedule
- Project Execution Plan
- Assigned PM
- Preliminary Budget $2.5 Million

T100EEU042307

FSS Issues (Examples)

DNFSB Letter	Reliability, SC design, VSS assertions, piping integrity, compensatory measures, flushing procedures, straining, tracking and trending , water supply, FP assessment.
SMP/VSS Assessment	Coal tar study, straining, flushing procedures, tracking and trending, hydraulic calculations, system corrosion, SC boundary, NFPA code deficiencies.
DAF DSA Annual Update	Reliability, hydraulic calculations, water tank as a SC system.
DNFSB Recommendation 2008-1	Safety Class design criteria, operability.

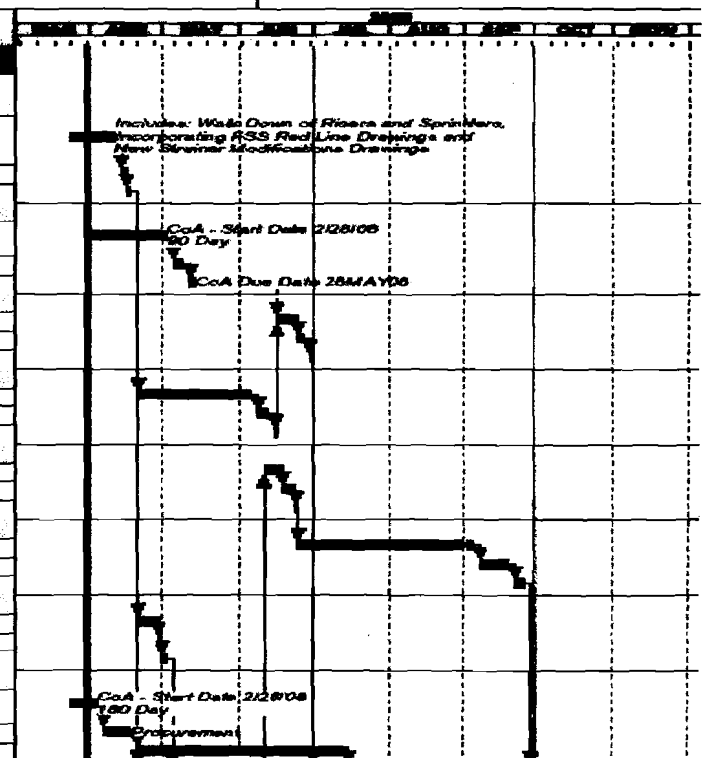
T100EEU042307

FSS Approach

- Perform Hydraulic Calculations
- Perform Reliability Analysis
- Conduct Lead-in Piping Flushing Analysis
- Strainer Replacement Project
- Coal Tar Study
- Flow Testing
- Gather Results and Determine Needed Approach

DAF FIRE SUPPRESSION SYSTEM PROJECT SCHEDULE

Data Date	31MAR06				Offical Use Only (OUO)	
[illegible]	[illegible]	[illegible]	[illegible]	%	[illegible]	[illegible]
DAF Fire Suppression System						
Fire Suppression System Doc Reviews and Anaylsis						
Develop Engineering Work Plan for FSS Work						
BAFS1010	Draft NSTec Engineering Work Plan	12	6	0	24MAR06A	10APR06
BAFS1012	Review Engineering Work Plan	2	2	0	14APR06	15APR06
BAFS1014	Approve Engineering Work Plan	2	2	0	16APR06	17APR06
Perform Hydraulic Calculations for FSS (CoA)						
BAFS1020	Perform Hydraulic Calculations & Draft Report	20	20	0	31MAR06	01MAY06
BAFS1022	Review Hydraulic Calculations	4	4	0	05MAY06	09MAY06
BAFS1024	Issue Hydraulic Calculations	2	2	0	12MAY06	13MAY06
Develop Basis for Strainer Requirements						
BAFS1030	Draft Basis for Strainer Requirements	5	5	0	17JUN06	24JUN06
BAFS1032	Review Basis for Strainer Requirements	2	2	0	26JUN06	29JUN06
BAFS1034	Approve & Issue Basis for Strainer Requirements	1	1	0	30JUN06	30JUN06
Perform Analysis on Coal Tar Sloughing						
BAFS1040	Perform Analysis on CT Sloughing & Draft Report	27	27	0	21APR06	06JUN06
BAFS1042	Review Draft CT Analysis Report	4	4	0	09JUN06	12JUN06
BAFS1044	Approve & Issue CT Sloughing Report	1	1	0	16JUN06	16JUN06
Develop DAF FSS Mode Design Requirements						
BAFS1050	Draft FSS Mode Design Requirements	5	5	0	11JUN06	16JUN06
BAFS1052	Review Draft FSS Mode Design Requirements	2	2	0	19JUN06	23JUN06
BAFS1054	Approve and Issue FSS Mode Design Requirements	1	1	0	24JUN06	24JUN06
Develop New DAF FSS Strainer Mode Drawings						
BAFS1060	Develop New DAF FSS Strainer Mode Drawings	40	40	0	25JUN06	04SEP06
BAFS1062	Review New DAF FSS Strainer Mode Drawings	6	6	0	06SEP06	15SEP06
BAFS1064	Approve & Issue DAF FSS Strainer Mode Drawings	4	4	0	22SEP06	25SEP06
Develop Tank Inspection Criteria						
BAFS1080	Draft Tank Inspection Criteria	5	5	0	21APR06	26APR06
BAFS1082	Review Draft Tank Inspection Criteria	2	2	0	29APR06	30APR06
BAFS1084	Approve and Issue Tank Inspection Criteria	1	1	0	01MAY06	01MAY06
Perform Reliability Analysis of FSS (CoA)						
BAFS1090	Draft Reliability Analysis Requirements for FSS	6	4	0	24MAR06A	03APR06
BAFS1092	Procure Services for FSS Reliability Analysis	6	6	0	07APR06	17APR06
BAFS1094	Perform FSS Reliability Analysis	48	48	0	21APR06	15JUL06



Early Bar
Progress Bar
Critical Activity

National Securities Technology (LLC)
DAF Schedule
DAF FSS Schedule

Official Use Only (OUO)

T100EEU042307

FSS Strainer Improvements

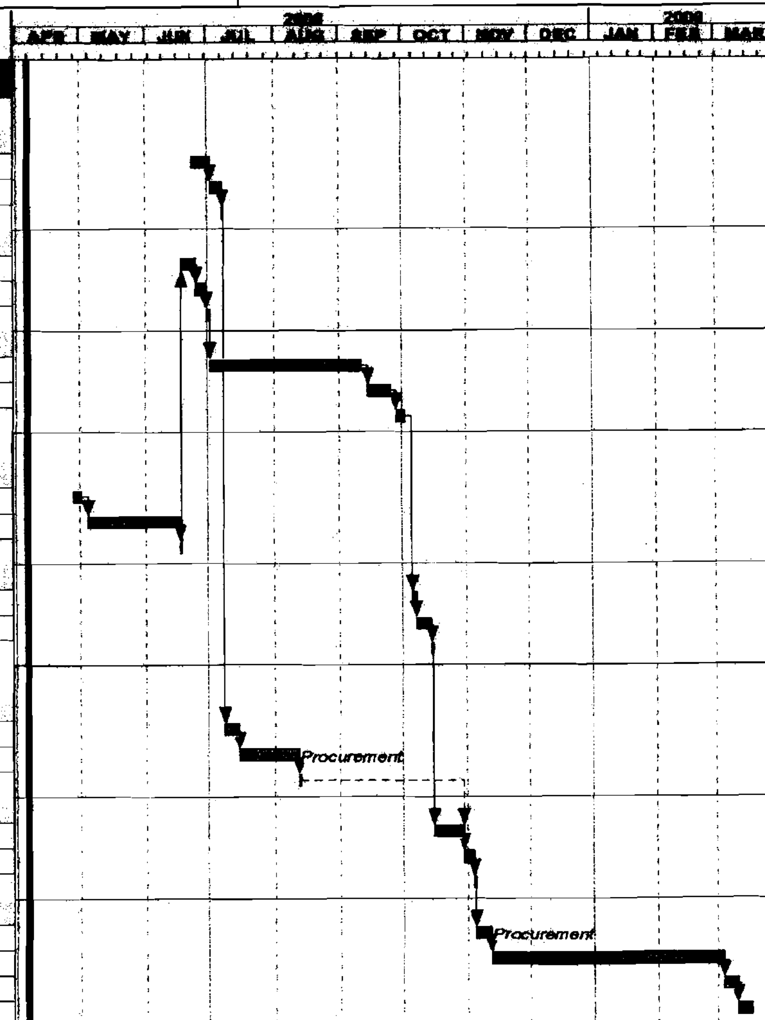
Issue:	Current strainers employed within the FSS are not NRTL approved.
Action:	Perform engineering design, purchase and installation of NRTL approved strainers with sufficient capacity to capture debris that would impair the sprinkler heads. Update/Revise hydraulic flow calculations.
Reason:	Achieve NRTL compliance
Schedule:	24 June 2008 – 17 March 2009

T100EEU042307

FSS DAF Strainers Improvement

Data Date	07APR08	Offical Use Only (OUO)	DAF Schedule

Activity ID	Activity Description	Orig Dur	Rem Dur	%	Early Start	Early Finish
DAF Fire Suppression System						
Fire Suppression System Doc Reviews and Anaylsis						
Develop Basis for Strainer Requirements						
BAFS1030	Draft Basis for Strainer Requirements	5	5	0	24JUN08	01JUL08
BAFS1032	Review Basis for Strainer Requirements	2	2	0	02JUL08	07JUL08
BAFS1034	Approve & Issue Basis for Strainer Requirements	1	1	0	08JUL08	08JUL08
Develop DAF FSS Mods Design Requirements						
BAFS1050	Draft FSS Mods Design Requirements	5	5	0	18JUN08	25JUN08
BAFS1052	Review Draft FSS Mods Design Requirements	2	2	0	26JUN08	30JUN08
BAFS1054	Approve and Issue FSS Mods Design Requirements	1	1	0	01JUL08	01JUL08
Develop New DAF FSS Strainer Mods Drawings						
BAFS1060	Develop New DAF FSS Strainer Mods Drawings	40	40	0	02JUL08	11SEP08
BAFS1062	Review New DAF FSS Strainer Mods Drawings	8	8	0	15SEP08	25SEP08
BAFS1064	Approve & Issue DAF FSS Strainer Mods Drawings	4	4	0	29SEP08	02OCT08
Fire Suppression System Facility Work						
Walk Down Facility Risers & Sprinklers						
BAFS2010	Develop WP for Walk Down Risers & Sprinklers	4	4	0	28APR08	01MAY08
BAFS2012	Walk Down FSS Risers & Sprinklers	24	24	0	05MAY08	16JUN08
BAFS2014	Submit Walk Down Markups to Engineering	1	1	0	17JUN08	17JUN08
Validate Engineering Drawings for Strainers						
BAFS2020	Develop WP for Validation of Strainer Drawings	2	2	0	06OCT08	07OCT08
BAFS2022	Perform Field Validation of Strainer Drawings	4	4	0	08OCT08	14OCT08
BAFS2024	Submit Validation Drawings to Engineering	1	1	0	15OCT08	15OCT08
Fire Suppression System Procurement/Construction						
Procure FSS Strainers						
BAFS3010	Develop Procurement Package for FSS Strainers	4	4	0	09JUL08	15JUL08
BAFS3012	Procure FSS Strainers	16	16	0	16JUL08	12AUG08
BAFS3014	Reciept Inspect FSS Strainers and Stage for Inst	1	1	0	13AUG08	13AUG08
Develop Construction Work Control Documents						
BAFS3020	Draft Construction WP for FSS Modification	8	8	0	16OCT08	29OCT08
BAFS3022	Review Construction WP for FSS Modification	2	2	0	30OCT08	03NOV08
BAFS3024	Approve Construction WP for FSS Modification	1	1	0	04NOV08	04NOV08
Modify / Install DAF FSS Strainers						
BAFS3060	Procure Services for FSS Modification	5	5	0	05NOV08	12NOV08
BAFS3062	Modify/ Install FSS Stainers	60	60	0	13NOV08	03MAR09
BAFS3064	Close-out Construction WP for FSS Modifications	4	4	0	04MAR09	10MAR09
BAFS3066	Asbuild FSS Drawings	4	4	0	11MAR09	17MAR09



T1C

FSS Reliability Analysis

Issue:	Analysis is needed to provide technical basis of 90% reliability of FSS. Schedule is needed to improve reliability of FSS.
Action:	Perform a RELIABILITY Analysis to establish a technical baseline.
Reason:	Provide a technical basis for the DSA/TSR and FSS system boundary. Provide input for determining subsequent decisions on FSS repairs/modifications/upgrades.
Schedule:	28 February 2008 – 28 July 2008

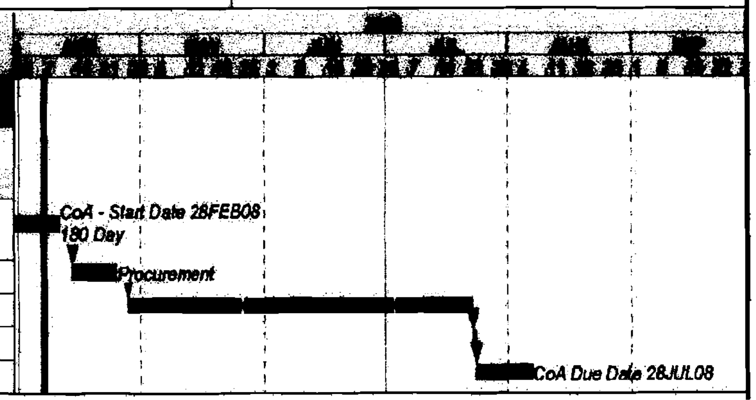
FSS Reliability Analysis

Data Date	07APR08	Offical Use Only (OUO)					DAF Schedule

Fire Suppression System Doc Reviews and Analysis

Perform Reliability Analysis of FSS (CoA)

BAFS1090	Draft Reliability Analysis Requirements for FSS	8	4	60	24MAR08A	10APR08
BAFS1092	Procure Services for FSS Reliability Analysis	8	8	0	14APR08	24APR08
BAFS1094	Perform FSS Reliability Analysis	48	48	0	28APR08	22JUL08
BAFS1096	Submit FSS Reliability Analysis to CSE	1	1	0	23JUL08	23JUL08
BAFS1098	Perform Indep. Rev.of FSS Reliability Analysis	8	8	0	24JUL08	08AUG08



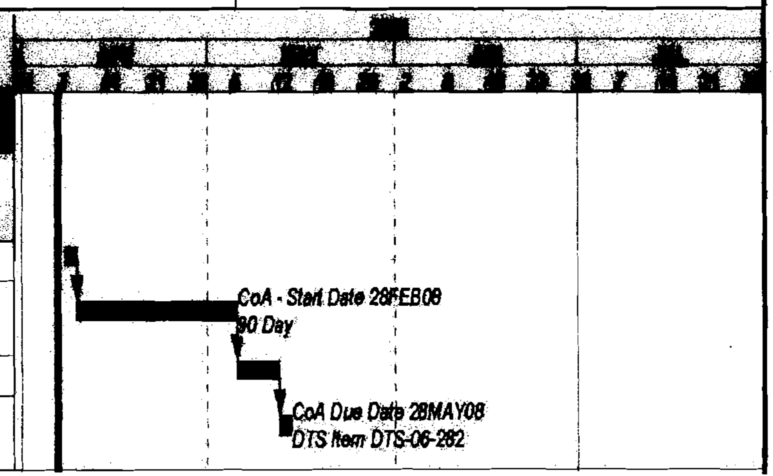
T100EEU042307

Hydraulic Calculation

Issue:	Hydraulic calculation is needed to provide technical basis to support DAF FSS water pressure value. Hydraulic calculation needed to address water density requirement.
Action:	Perform hydraulic calculation utilizing the validated hydraulic model Hydraulic Analyzer Sprinkler Systems (HAAS).
Reason:	Provide a calculated flow rate and pressure analysis for the DAF FSS per NFPA-13.
Schedule:	31 March 2008 – 13 May 2008

Hydraulic Calculation

Data Date	07APR08	Offical Use Only (OUO)				DAF Schedule
Fire Suppression System Doc Reviews and Analysis						
Perform Hydraulic Calculations for FSS (CoA)						
BAFS1018	Hughes Assoc. Walk Down FSS for Calculations	2	2	0	08APR08*	09APR08
BAFS1020	Perform Hydraulic Calculations & Draft Report	14	14	0	10APR08	06MAY08
BAFS1022	Review Hydraulic Calculations	4	4	0	08MAY08	12MAY08
BAFS1024	Issue Hydraulic Calculations	2	2	0	13MAY08	14MAY08



T100EEU042307

FSS Flushing Test Surveillance

Issue: There are no quantitative criteria for a pass/fail on FSS flush tests.

Action: Change the existing surveillance flushing procedure to incorporate quantitative pass/fail criteria.

Reason: Provides empirical basis for determining whether a facility FSS passes or fails the surveillance requirement rather than relying on best engineering judgment.

Schedule: 21 April 2008 – 21 April 2008

17 March 2009 – 17 March 2009 (post strainer installation)

T100EEU042307

Water Tank

Issue:	The DAF FSS water tank is not within the FSS safety class boundary.
Action:	Incorporate FSS water tank within the FSS safety class boundary. Inspect and repair/replace (as determined by inspection results).
Reason:	Place water tank within the boundaries of the FSS system. Improve reliability of the FSS.
Schedule:	May 2008 November 2008 (repair/replace decision)

T100EEU042307

Coal Tar

Issue: Coal tar is sloughing from the FSS lead-in pipes.

Action: Analyze coal tar sloughing mechanism.

Perform a time phased analysis of the collected coal tar debris.

Perform NDE analysis of lead-in pipes.

Reason: To understand the coal tar release process within the lead-in pipes to assess further actions to be undertaken.

To determine the characteristics of the debris to assess potential corrosion issues.

Incorporated with other data/analysis assist in making a decision on path forward for lead-in CAs.

Schedule: 28 April 2008 – 23 June 2008

Flow Tests

- Issues:
  - Conduct flow Tests Beyond Strainers to determine water delivering capacity to the Sprinkler system
- Actions:
  - Develop Flow Procedures for Post Straining Testing
- Reasons:
  - Provide Data to Support Sprinkler System Demand
  - Determine what debris may pass through the strainers and potentially impare the Sprinkler Head Flow Demand
- Schedule:
  - April 24, 2008 – August 30, 2008

FSS Operability

- FSS operability and the means to demonstrate it are found in DAF-TSR-01, Rev. 5, 9-6-2005, section 3 / 4.4, “Fire Suppression System LCO and Surveillance Requirement.”

- TSR is robust.
  - SR 4.4.6, “Perform system flush” conducted in August 2007, resulted in four buildings having FSS declared inoperable and PISA submitted in September 2007.

- Occurrence Report NA-NVSQ-LLNV-2007-0007, “Potential Impact on FSS Operability because of Increasing Coal Tar (PISA)”
  - Corrective action 1: Increase FSS Flushing Surveillance from every two years to annually. Completed 1 November 2007.

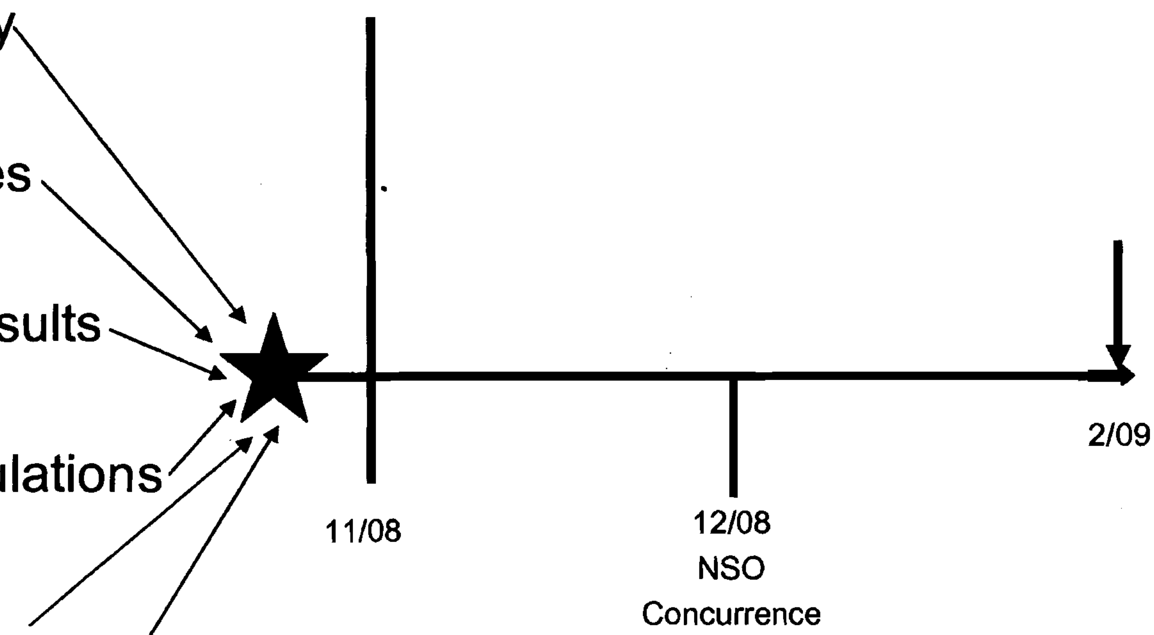
FSS Decision Point

<u>Inputs</u>

- Reliability Study
- Coal Tar Studies
- Water Tank Results
- Hydraulic Calculations
- Strainer Design
- Flow Test Results

<u>Decision Points</u>

NSTec Preliminary Recommendations



DAF FSS Project Path Forward

- Resolution of Fire Suppression System issues being managed as a project

- Structured path forward which addresses current short term actions and will propose interim and long term alternatives
  - Hydraulic Calculations
  - Reliability Analysis
  - Strainers Replacement

- FSS operability being monitored as dictated in the DAF safety basis

T100EEU042307

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700 Washington, D.C. 20004-2901
(202) 694-7000

January 18, 2008

The Honorable Thomas P. D'Agostino
Administrator
National Nuclear Security Administration
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

ACTION	Golden
INFO	NST (R.T. BROCK) AMNS
NSO/MGR	✓
AMEM	
AMNS	✓
AMSO	
AMSS	

Dear Mr. D'Agostino:

The Device Assembly Facility (DAF) at the Nevada Test Site continues to implement planned activities that expand its mission, including receipt, storage, and operations involving special nuclear material; nuclear explosive operations; and the installation of equipment to perform potential criticality experiments. The Defense Nuclear Facilities Safety Board (Board) has identified major issues with the safety related fire suppression system. These issues call into question the ability of the system to perform reliably in case of need. The Board has previously expressed concerns with respect to the reliability of the DAF fire suppression system in letters to the National Nuclear Security Administration (NNSA) dated November 3, 2004, and November 28, 2005. The fire suppression system deficiencies raised in those letters remain largely unaddressed.

The Board's staff recently conducted a review of fire protection at DAF and identified several significant issues concerning the availability and reliability of safety-class and safety-significant fire protection features. The fire suppression system does not meet the typical design features for a safety-class system, e.g., redundancy to preclude a single active failure or a safety-significant system. In addition, the potential for impairment of the existing fire suppression system is not clearly defined in the DAF safety basis. These issues are documented in the enclosed report.

In the past year, the Nevada Site Office conducted vital safety system reviews, safety management program assessments, and a review of the draft update to the DAF safety basis. These efforts have also identified a list of deficiencies in the fire protection system at DAF.

The Board is especially concerned about the continuing degradation of the underground piping that supplies water to the DAF fire protection system. This degradation results in unacceptable amounts of debris in the water supply, which can adversely impact the fire protection system. The Board does not believe that periodic flushing and cleaning of strainers is an adequate strategy ensuring that the fire protection system will perform as anticipated in the

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
Staff Issue Report

November 20, 2007

MEMORANDUM FOR: J. K. Fortenberry, Technical Director

COPIES: Board Members

FROM: C. March
J. Deplitch

SUBJECT: Fire Protection at the Device Assembly Facility

This report documents a review conducted by the staff of the Defense Nuclear Facilities Safety Board (Board) of fire protection at the Device Assembly Facility (DAF) at the Nevada Test Site. To perform this review, staff members C. March and J. Deplitch met with representatives of the Laboratory Joint Nevada Test Site Program Office, Lawrence Livermore National Laboratory, National Security Technologies, LLC, and the National Nuclear Security Administration's Nevada Site Office (NSO).

Background. DAF was designed in the 1980s, with construction of the facility beginning in April 1988. Lawrence Livermore National Laboratory and Los Alamos National Laboratory took beneficial occupancy in 1996, and operations began in 1998.

DAF has a fire protection program as required by Department of Energy Order 420.1A, *Facility Safety*. Passive protection features incorporate 2-hour rated fire barriers between the various DAF buildings, creating separate fire areas, while active fire suppression consists of automatic sprinklers. The water supply for DAF is provided by a 250,000 gallon on-ground steel water storage tank located on a hill approximately 0.5 miles behind and 230 feet above DAF. A single 12-inch diameter main feeds a 10-inch diameter cement-lined ductile iron underground distribution loop, providing domestic potable, industrial, and firefighting water to DAF.

All buildings (except the parking garage, Building 510) are currently protected by automatic sprinkler systems. The systems in buildings that would support nuclear explosive operations are designated safety-class, while the systems in buildings for the downdraft table, glovebox, and Criticality Experiments Facility are designated safety-significant. DAF also has a fire alarm system to warn personnel of fires, radiation alarms, security intrusions, or gas attacks in the facility. Should any of these threats occur, the fire alarm system would respond with audible and visual warnings unique to the threat. Both levels of DAF are also provided with portable fire extinguishers and equipped with wet standpipe systems for use by the Nevada Test Site fire department.

- The strainers used to collect foreign material in the flush water do not necessarily have the same mesh size as the strainers installed in the risers. In many cases, the perforations of the test strainer are larger than those of the permanent riser strainer. This test arrangement captures less material than do the permanent strainers and does not reflect the potential for plugging of the permanent strainers. Further, there is an unknown quantity of debris passing through the test strainer, resulting in an underestimate of how much lining or corrosion products are being removed to protect the risers.

- While some flow data are collected, the procedure does not establish minimum flushing rates to obtain a minimum velocity of 10 feet per second as recommended in NFPA 13 and NFPA 25.

- There are no acceptance criteria to evaluate whether the quantity of debris collected during a flush warrants considering the system failed and/or requiring more frequent flushing. Decisions are based on the judgment of the system engineer, which appear qualitative and arbitrary.

- Annual flushing for the underground lead-ins was originally established in 1995 and continued through 2005. With implementation of the DAF Documented Safety Analysis (DSA) and the associated Technical Safety Requirements (TSRs), the frequency of flushing for all systems was changed to every 2 years, but no technical justification was provided for the schedule change.

Tracking and Trending of Underground Lead-in Flushing. Foreign material collected during the flushing operations performed since 1995 has been retained; however, no formal tracking or trending of the available data had been conducted until this year. This process is being conducted on an ad hoc basis, with the quantity of lining, collected by building, being entered into a system engineer's spreadsheet. While this information is useful, additional evaluation may be warranted. The staff's observations on other tracking and trending issues are summarized below:

- The 2007 data collected to date indicate a noticeable increase in the foreign material collected for some systems, and a significant increase for five systems. This situation needs to be evaluated to determine the appropriate course of action for future flushing.

- The material collected from some buildings appears to have changed from liner material to mineral nodules, scale, and iron oxide particles, indicating the likelihood of significant corrosion of the piping material. The impact of such corrosion may be significant.

- Several life safety deficiencies had been identified, but not documented with appropriate exemptions or equivalencies.

- The contractor's assessment process for the fire protection program was not comprehensive.

- The fire detection system for one building with a safety-class sprinkler system is not designated as safety-class, even though its failure would prevent the operation of the sprinkler system's capabilities.

NSO and DAF management are working to develop an acceptable corrective action plan for all of the findings of the NSO assessments.

Update of Documented Safety Analysis. The second update to the DAF DSA and TSRs approved in December 2003 is being developed. The update is a major revision of the DSA and TSRs. NSO has provided comments on the draft update, including comments on the fire protection system that are consistent with the findings of its assessments. NSO's comments address the reliability and vulnerabilities of the fire suppression system, the availability of the water supply, and the advisability of considering the water supply system a safety system.

The contractor's resolution of NSO's comments includes adding to the TSRs a specific administrative control for an 8-foot standoff distance between combustible materials and high explosives, as well as daily surveillance of the riser pressure. The 8-foot standoff distance is consistent with practice at the Pantex Plant, although the content and quantity of combustible material appear to be undefined. Riser pressure will provide some indication of the availability of water, although it will not provide verification of an adequate water flow. While the addition of these specific administrative controls represents an improvement, the Board's staff believes they should be treated as compensatory measures until deficiencies of the engineered controls are corrected, and defined as defense-in-depth thereafter.

Conclusion. The fire suppression system at DAF does not meet the expectations of a safety-class or safety-significant system. Numerous deficiencies have been identified, and the potential for impairment of the system is not clearly identified in the DAF DSA. These findings and deficiencies need to be explicitly acknowledged in the authorization basis, and appropriate compensatory measures instituted pending completion of corrective actions. This should be completed before more hazardous nuclear operations, e.g., nuclear explosive operations or criticality experiments, begin at DAF.